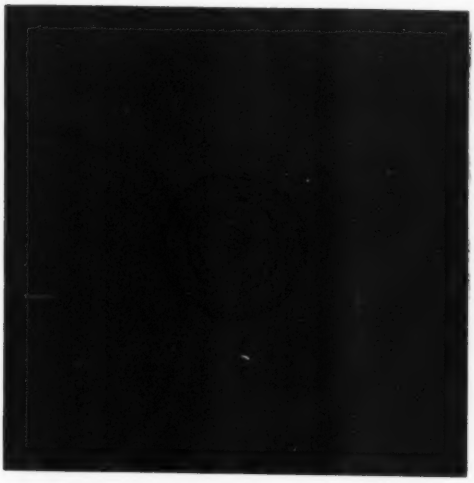
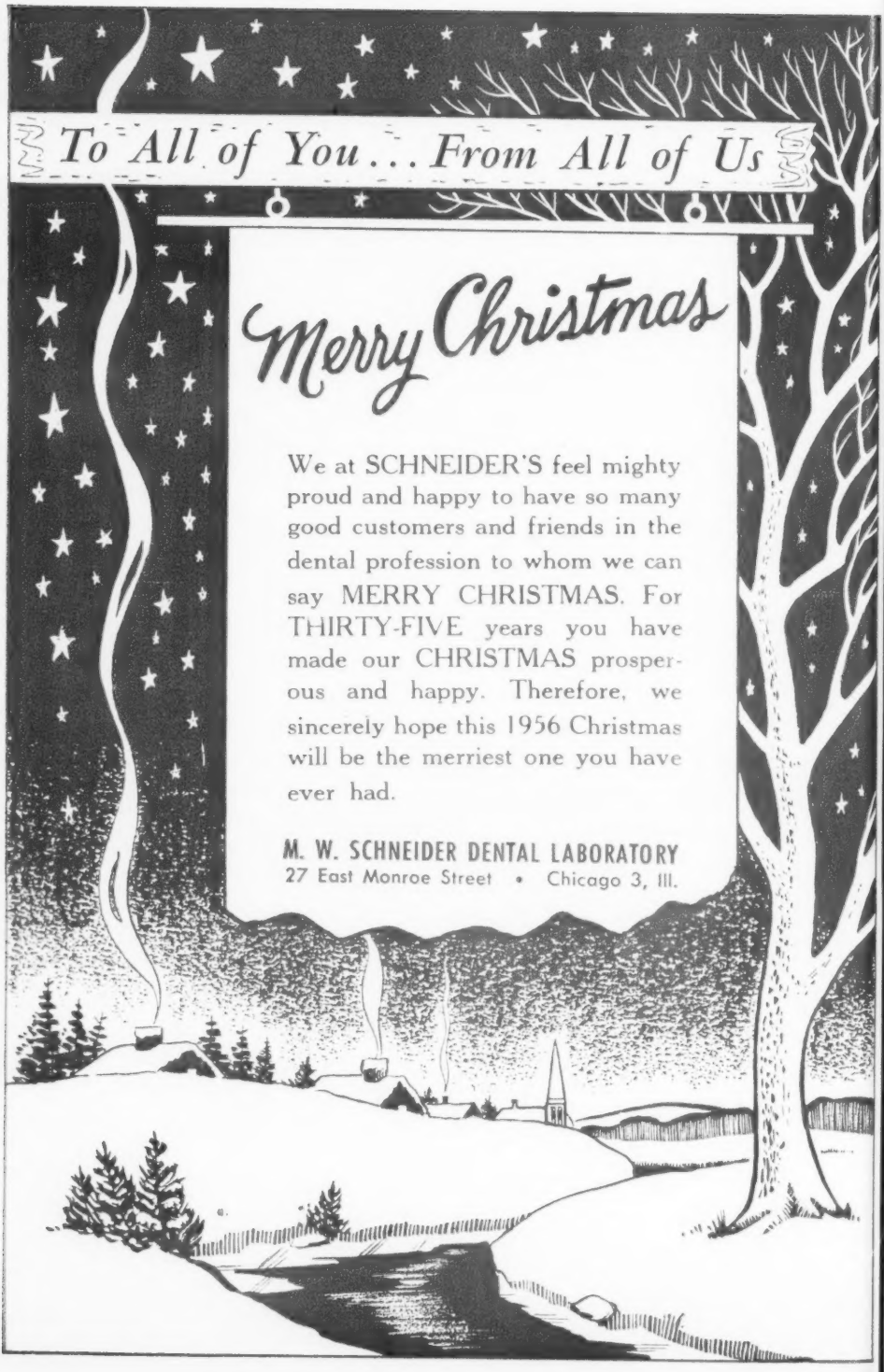
ILLINOIS DENTAL JOURNAL



volume 25 number 12 december 1956

SPECIAL
HIGH SPEED
ISSUE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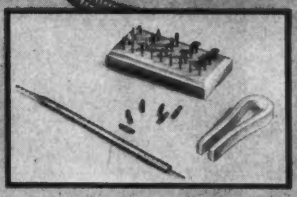

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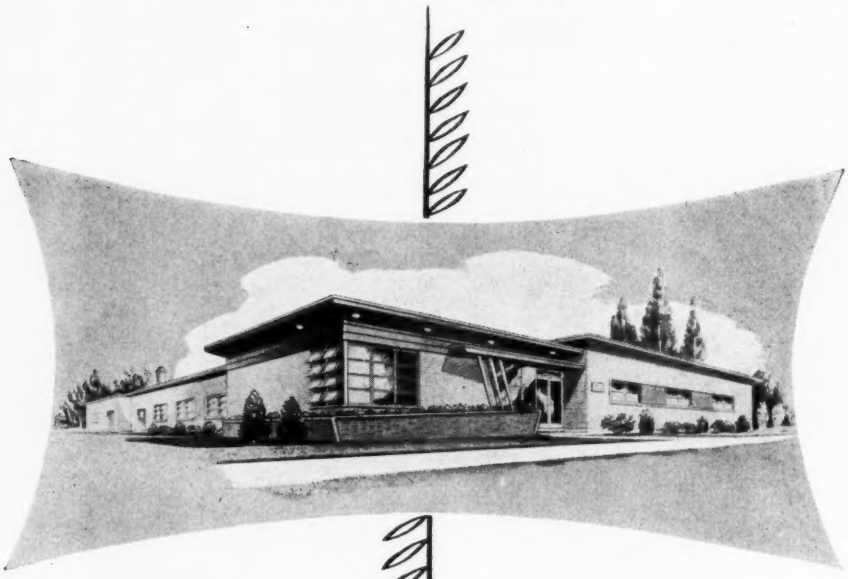

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December, 1956

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Let us give thanks!

We have travelled and travelled, a long hard year over a long hard road. But now the holiday season is just ahead, around the stand of brightly lighted Christmas trees under that gleaming star.

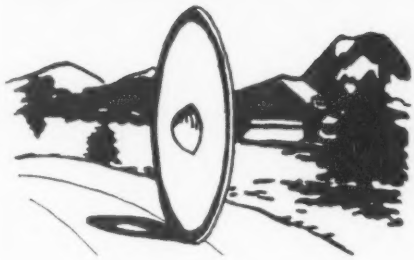
And so for ourselves, the editorial staff here in the Chicago office, and for the officers and Council of the Illinois State Dental Society, we wish you all a very merry Christmas and a joyous, peaceful, and prosperous New Year.

As we mentally review the year since last Christmas and New Year, we must admit we have an abundance to be thankful for. We have had a good year under fine society officers. Luckily, the denturists were soundly defeated, at least for the time, and the illegal laboratories must realize they are looking at the prophetic handwriting on the wall. As we write this, we have just received word that the plea of the illegal group for a rehearing, has been denied by the Supreme Court.

We are very lucky for at least one more thing, really lucky: that we live in the good old United States and not in Hungary. Under Russian Communism it would be pretty difficult, and maybe fatal, to say Merry Christmas.

So, let's all say it again, this time good and loud, and be glad that we are free to say it—Merry Christmas.—*W.P.S.*

HIGH SPEED and SUPER SPEED



by the High Speed Committee of the Chicago Academy of Dental Research

(Figure 1) Surface feet per minute (m.p.h.)

THE purpose of this paper is to present the methods by which members of the Chicago Academy of Dental Research developed the use of higher handpiece speeds. It will cover their clinical findings and observations over a five year period.

At the inception of our investigation into the use of higher handpiece speed we hoped to achieve two goals:

1. To utilize the full-cutting potential of present day cutting instruments.
2. To reduce the trauma of cavity preparation.

Industry has long made use of the principle of high rotary speeds to obtain increased cutting efficiency from carbon-tungsten drills and diamond grit abrasive wheels. This same principle could be utilized in dentistry.

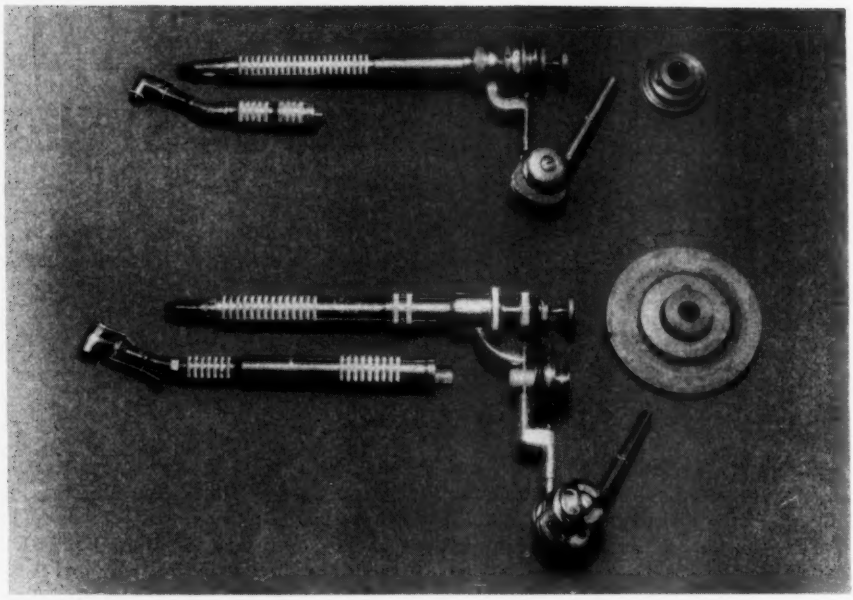
Reduction of trauma was the prime factor in the quest for high handpiece speeds. Trauma applies not only to the tooth undergoing operative techniques, but to the patient and the operator as well.

What is "high speed"? In reality, high speed is the number of surface feet of contact of a dental cutting instrument per minute. Thus the surface feet per minute of the instrument represented in Figure 1 would be measured by multiplying the circumference of the instrument by the number of revolutions per minute. In dental practice the size of the cutting instruments used is dictated by the tooth and the type of preparation needed. So for practical purposes, high speed can be measured by referring to the relatively constant factor of revolutions per minute (rpm) delivered at the working end of the handpiece.

Until very recently most dental units were designed to rotate an instrument between 4,000 and 6,000 revolutions per minute at the handpiece. When certain mechanical and/or electrical changes are made, these same dental units are capable of delivering 12,000 to 40,000 revolutions per minute. It is this speed range that shall be called "high speed," because at these speeds the reduction in trauma becomes evident.

The term "super speed" applies to a speed range of 100,000 revolutions per minute or more, which new devices can deliver with a standard modified unit.

The following is an outline of the various methods we used to change our standard office equipment to high speed. These changes are basic mea-



(Figure 2) Top: conventional handpiece and contra angle with small motor pulley. Bottom: Midwest high-speed handpiece with midget pulley and transpeed, and long sheath contra angle. Also 2½ inch formica motor pulley.

sures and the use of one, or the combination of several, will bring your handpiece speed to a well-defined range.

Mechanical Changes

An increase in handpiece speed is easily achieved by increasing the diameter of the pulley at the motor drive shaft. A large pulley at the motor increases the belt driven speed because the further away from the center of rotation, the greater the peripheral speed. The belt travels a greater distance in a single revolution of the drive shaft than it would on a smaller pulley.

The diameter of the conventional motor pulley supplied with a dental unit has a diameter of 1⅛ inches. Figure 2 shows a pulley with a diameter of 2½ inches. This pulley is made of formica to decrease the weight on the motor drive shaft so as to maintain an efficient cutting torque. Also available is an aluminum pulley of 3¾ inch diameter which is efficient, but has its limitations. The inertia of its weight causes a time delay in reaching its maximum speed and a time delay in coming to a full stop. Also the cutting torque is decreased.

Large Pulley

Using the large pulley necessitates making certain minor changes to the engine arm. The changes will vary with the type of dental unit being used (i.e. Ritter models A, B, C, D, E, require an extension outrigger; all S. S. White master units require lengthening the axle shaft of the large idler pulleys). These changes are easily made

and many manufacturers supply the necessary parts.

The second mechanical method is to reduce the size of the pulley at the handpiece (Figure 2). This is the reverse of the large pulley principle at the motor drive shaft. Most high-speed handpieces now manufactured use a small or midget pulley to gain as much mechanical advantage as possible.

By using a 2½ inch formica pulley at the motor and a high-speed handpiece with a small pulley, the speed at the handpiece will range from 10,000 rpm to 13,000 rpm. This is Stage I of high-speed operation.

Electrical Changes

Stage I speed may be also achieved by an electrical method. By disconnecting the resistors in the dental unit and making no other change except to install a high-speed handpiece, a speed range of 15,000 to 19,000 rpm is obtained.

Disconnecting the resistors eliminates a retarding force to the amount of current supplied to the armature. The armature now receives the full line current and will revolve at its maximum speed.

If a combination of the large pulley principle and the elimination of the resistors are employed, a speed range of 20,000 to 25,000 rpm will result. This range we consider Stage II of high speed.

If the operator would like to reduce his speed to Stage I, a simple switch may be installed on the dental unit that would reconnect the resistors. This allows a return to lower speed for efficient use of prophylaxis angles, automatic amalgam instruments, surgical mallets, etc.

A further increase to Stage III may be attained by removing the outer wire wrapping of the armature. This increases the distance between the armature and the field coils allowing for an increase in speed and a slight reduction in torque. The speed range will now be 30,000 rpm to 35,000 rpm.

The above mentioned stages are the basic methods used to increase operating speeds. Other important factors must be considered as they can directly influence the speed obtained. They are:

1. The belt tension should be adjusted so that it is as loose as possible without slippage. Listening for the highest pitch of the motor and the whine of the belt, while adjusting the engine arm length, will enable the operator to accurately gauge the tension for maximum speed.
2. For those offices with a fluctuating electrical current, the use of a step-up line transformer will insure a constant 130 volts. These transformers are commercially available at electrical suppliers (Powerstat or Variac).
3. Correct lubrication of the engine guide pulleys, handpiece, and contra angle decreases friction.
4. Ball bearing engine arm idler pulleys increases the speed by offering less resistance to the drive belt.
5. Most of the new dental units available now have incorporated some mechanical and electrical changes to increase the motor speed.
6. The design of the handpiece and contra angle is an important factor.

High Speed Handpiece

A high speed handpiece is an instrument capable of transmitting high speed rotary movement to a cutting instrument with minimal heat rise, minimal vibration transmission, and with efficient cutting torque.

When we attempted to use conventional handpieces and angles at high speed, we found they overheated and

the excessive wear caused rapid mechanical breakdown.

The factors which allow a handpiece and contra angle to operate at higher speeds are (1) design, (2) quality control in construction, and (3) maintenance.

Design: The bearing surfaces and design of the outer sheath are important in a high-speed instrument. Basically there are two types of bearings, friction bearings and ball bearings. The conventional handpiece has friction bearings made of steel or brass which create heat and wear problems at higher speeds. A high-speed handpiece using friction bearings has improved materials at the bearing surfaces. They are usually combinations of glass, stainless steel, or hard chrome surfaces.

Ball-bearing Handpiece

A high-speed ball bearing handpiece depends upon the contact of a ball bearing race to carry the load of the moving parts. This helps to reduce the heat rise and minimizes the maintenance requirements. Another design feature of a modern instrument is that the rotating spindle does not contact the outer sheath. In the contra angle a long sheath has been added to help reduce the vibration transmission.

Quality control: The manufacturers have produced instruments built to closer tolerances between the moving parts instead of the older "sloppy fit" handpieces. This fact, plus better assembly and selectivity of the parts of an instrument, allows for ease of operating at higher speeds. Since our early experiments in the use of high speed equipment we have been aware of the requirement for the utmost in quality control. We are pleased with the cooperation and the progress that has been made by most manufacturers in improving the design and quality of high-speed equipment.

Maintenance: Higher speeds and the use of a constant air-water spray creates an environment of heat and debris at the bearings that necessitates more frequent cleaning and lubrication of the handpiece and angle. When using a high-speed handpiece the manufacturer's recommendations for cleaning and lubrication should be followed meticulously. We find our best results are obtained when the contra angle is properly cleaned and lubricated after each use. An excess of lubricant creates additional frictional heat and must be guarded against.

Cutting Instruments

In applying high-speed rotary instruments to the tooth we are primarily concerned with diamond instruments and tungsten carbon (carbide) burs.

Generally, the cutting efficiency of the carbide bur increases as the speed increases. Clinically, however, the carbide bur may not show an increase in cutting efficiency at certain speed ranges between 12,000 and 40,000 revolutions per minute. This is due to the fact that small increases of the revolutions per minute do not appreciably increase the surface feet per minute contact because of the small diameter of these burs.

The cutting efficiency of diamond instruments increases as the speed increases, but the following factors will influence the cutting efficiency of diamond instruments:

1. *Concentricity*: Instruments must rotate concentrically at high speeds in order to maintain continuous peripheral contact with the tooth. If instruments are not concentric, peaks of vibration in the zone most irritating to

the patient are developed. Permanent mounting of wheels and stones, instead of mandrel mounting, becomes desirable. A test for concentricity is to rotate the diamond in a handpiece very slowly. A wobble indicates a lack of concentricity and that instrument should be discarded.

Smaller Mesh Diamonds

2. *Particle size:* High speed requires smaller mesh diamonds to reduce vibrations. Diamond instruments with particles of 400 mesh or smaller perform more smoothly at high speed than large particle size instruments. At slow speeds, below 10,000 rpm, fine mesh diamonds would not cut efficiently; before the era of high speeds, therefore, most diamond instruments had large particles. They are to be discarded if the patient and the tooth are considered during preparations.

3. *Evenness of distribution:* In order to insure an ideally continuous peripheral contact of instrument on tooth and again help to reduce vibration, the particles of diamond must be distributed as evenly as possible. There must be no high points and no areas of craters or missing diamonds. A high point on a diamond instrument will cause an excessive vibration until it is knocked or worn off by the tooth.

4. *Right size for the job:* With high speed the general rule is to use the largest sized instrument that the location and desired cut will allow. When purchasing diamond instruments the dentist should examine each one individually with a magnifying lens. He should reject those that do not meet the above qualifications.

The application of the cutting instrument to the tooth using high speed is quite different from the slow-speed method. We no longer use the bur or diamond as an explorer while we are cutting tooth structure. We "rev-up" the instrument to its highest speed before touching the tooth and then apply it with just enough load to cut effectively. It is possible to cut tooth structure at loads of one-half ounce or less. We no longer push our way through the enamel. For the first time we begin to approach the cutting potential of the instrument.

We found that steel burs and vitrified abrasives (carborundum) cut more efficiently at high speed but their rapid wear limits their use.

Compiling Data

One of the most important aspects of our high-speed studies was the information systematically collected.

(Figure 3) PREPARATION TIME (minutes)

R.P.M.	2-Surface	3-Surface	Full Crown
6,000	18	25	39
12,000	9	16	27
18,000	5	9	12
24,000	4½	6	10
30,000	4	6	9½
40,000	3½	5½	8½

Time study charts were filled out for each two-surface, three-surface, and full crown preparation, and on each chart was recorded:

1. The tooth operated on
2. The revolutions per minute used
3. The type of preparation
4. Anesthetic used
5. Time of preparation
6. Type of coolant used
7. Pulp test prior to preparation
8. Pulp test one month later (when possible)
9. Patient's subjective reaction
10. Operator's instrumentation

Over 5,000 such data charts were collected during the period 1952-1954.

Clinical Findings

Our clinical observations resulted in finding four basic factors in the production of trauma to the tooth which we can control.

1. Duration of cutting
2. Heat Production
3. Pressure or load
4. Vibration

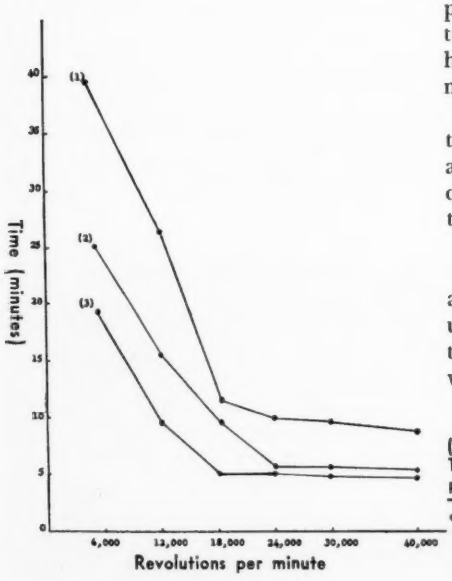
Time Study Results

Duration of cutting: Figure 3 shows the results of our time studies, and Figure 4 is a graphic projection of this. In general our results show that as the rpm increases, the time of preparation decreases. They illustrate that as the rpm increases, above 12,000 rpm there is a marked reduction in cutting time, up to about 22,000 rpm. Between 22,000 and 40,000 rpm the cutting efficiency tapers off, so that the time reduction becomes very minimal beyond this point.

It is also interesting to note that the cutting time is reduced most dramatically with the full crown preparation. This is due to the fact that with the crown preparation, diamond instruments of larger circumference can be utilized which increases the surface feet per minute cutting of the tooth structure. It emphasizes the principle that high speed is most efficient in the removal of bulk tooth structure.

All the patients responded favorably to the time reduction, while the operators were impressed with the ease of control as well as the reduced cutting time.

Heat Production: It is essential that a coolant, preferably a water spray, be used during all high-speed preparations. Peyton* has shown that we are well within safe limits when operating



(Figure 4) #1. Full crown preparations. #2. Three-surface preparations. #3. Two-surface preparations.

*Peyton, F. A. Temperature rise and cutting efficiency of rotating instruments. *N.Y.D.J.* 18:439, Nov. 1952.

at high speeds with a water spray, in fact, safer than at 6,000 rpm without a coolant. All the high-speed preparations in this study were done using a constant water spray. Clinically, pulp findings were negative. It is the opinion of our group that an air water spray is the coolant of choice and adequate for pulp protection.

Pressure: Only light cutting pressure need be used when working at high speed because of the increased cutting efficiency. This also results in less heat production.

The patients responded favorably to the lighter touch required. With the freedom of cut obtained by the increased cutting efficiency of our instruments, the operators experienced less mental and physical fatigue.

Vibration: We found that high handpiece speeds and true running instruments reduced the vibrations perceived by the patient. This reduction in vibration is the prime reason for obtaining speeds between the 22,000 and 40,000 rpm range, despite the fact that cutting efficiency is not greatly improved.

There are two types of vibrations perceptible by the patient in tooth preparations. The first are vibrations that are air-borne and perceived by the patient through his auditory mechanism. The second are bone-conducted vibrations, probably transmitted through the periodontal membrane fibers. This second type of vibration is particularly irritating to the patient since it cannot be masked by any air-borne vibrations.

100,000 rpm Speed Range

Efforts to eliminate the traumatic effects of bone-conducted vibrations led to the use of "superspeed"—a speed range over 100,000 rpm.

A super-speed handpiece or angle is an instrument capable of transmitting 100,000 rpm (or more) to a cutting instrument with minimal heat rise, minimal vibration transmission, and efficient cutting torque. Such a device offers certain advantages that are not obtainable with high speed: (1) The vibration perceived by the patient is dramatically reduced. (2) Smaller sizes of cutting instruments can accomplish the same result as the large wheel or disc. (3) The operator has a freedom of cut and an ease of control that approaches the full cutting potential of the carbide or diamond instrument.

Three Current Angles

Super speed angles, presently available, obtain their speeds by two different methods: (1) A pulley ratio device using a belt transmission to step up the speed by going from large pulley to small pulley within the angle. (2) A gear ratio increase in speed through the use of a step-up gear transmission within the angle. All super speed instruments use ball bearings.

In line with this, members of the Chicago Academy of Dental Research have experimented with super speeds and contributed to the development and testing of the Page-Chayes angle. For the past year and a half we have been applying super speed, clinically, using this instrument. Recently two other instruments capable of operating at super speeds have been tested: the Midwest Dental Manufacturing Company's contra angle, capable of producing over 100,000 rpm, and the Globe Angle, which can produce speeds of 100,000 rpm, utilizing principles similar to the Page-Chayes' instrument. Most handpiece manufacturers recognize dentistry's interest in super speed and are doing research to continue advancements in this field.

(Continued on page 798)

Using the Ultrasonic Dent it

AS members of the Ultrasonic Dental Research Group of Chicago, a group of eight private clinicians, we have worked with the ultrasonic dental unit in our own practices in order to evaluate this instrument in its application to routine dental practice. This paper is based on our findings in private practice from September 1954 to February 1956, and covers these main areas:

1. A review of research on and development of the ultrasonic dental unit.
2. A description of the equipment and principles of its operation.
3. Details of technics employed with the ultrasonic unit.
4. Analysis and comparison of ultrasonic, rotary, and air abrasive methods.
5. Summary of advantages and disadvantages of the ultrasonic unit in routine dental practice.

The removal of material by ultrasonic machining, by means of the patented Cavitron ultrasonic cutting process, is not new. The process has been in continuous and successful industrial use for more than ten years—using a liquid cutting compound (hard, finely divided particles of aluminum oxide suspended in an air-water mixture) in combination with a rapidly vibrating tool possessing a minute stroke amplitude.

The fact that human teeth could be cut effectively and with an absolute minimum of heat, noise, and vibration by this method was known as early as 1947 as a result of experiments carried out in the company laboratories. Extensive engineering research and development, however, were required before the process, as used in precision industrial machining, could be utilized in an instrument acceptable for biological and clinical evaluation for dentistry.

Drs. Carl Oman and Edmund Applebaum of the Columbia University School of Dental and Oral Surgery reported in 1954 that preliminary histologic study of a limited number of monkey teeth showed no significant difference in the effects upon pulps or tooth structure between those teeth cut with rotary instruments and those teeth cut with the ultrasonic dental unit.

As of October 15, 1956, biological and clinical evaluation of the ultrasonic dental unit was under way at seventeen dental schools, five hospitals and clinics, and five governmental dental research centers.

Based on a paper presented at the 91st Annual Midwinter Meeting of the Chicago Dental Society, Chicago, February 1956.

in Restorative Technics

by the Ultrasonic Dental Research Group of Chicago

The purpose of this large scale program has been and continues to be three-fold:

1. Ascertain the comparative effects of the ultrasonic dental unit and conventional rotary instruments upon tooth structure and the oral tissues.
2. Establish the extent to which the ultrasonic method of cavity preparation may be adapted to dentistry.
3. Ascertain desirable modifications of the instrument to better conform to the requirements of the dental profession.

During 1956, independent dental researchers at six individual research centers presented a total of eight histopathological reports[1-8] covering work on dog, monkey, and human teeth—all reconfirming earlier reports to the effect that the ultrasonic dental unit caused no more damage to dental structures than does any other operative instrument presently utilized in the dental office.

The ultrasonic dental unit consists of four major components:

1. An electronic generator, housed in a mobile cabinet, which converts 60 cycle A.C. house current into 29,000 cycle A.C.
2. A handpiece which converts the 29,000 cycle electrical energy into mechanical vibrations of the same frequency.
3. An abrasive system which provides a mixture of air, water, and finely divided aluminum oxide particles pumped to the cutting site through a fine vinyl plastic feedline.
4. A foot switch which controls the unit.

Simply stated, the Cavitron process converts electrical energy in the form of 29,000 cycle alternating current into mechanical energy in the form of 29,000 tiny mechanical vibrations per second; in turn, the cutting tip vibrates 29,000 times per second with an amplitude of about .0014 inch. An abrasive in a liquid carrier is washed across the vibrating tool. The ultrasonic cutting tip activates the particles of aluminum oxide in the abrasive mixture, urging them against the surface to be cut. And the motion imparted to each individual particle is of extremely low velocity, in the order of nine hundredths of a foot per minute (.09 feet) compared to the velocity of approximately 1,200 feet per minute with which a diamond point strikes the tooth in the case of a half inch wheel rotating at 9,000 rpm.

Drs. Jules Barrash, Stanley Goldberg, Norman Kirschner, Joseph Kronn, William Semiloff, Harold Sitron, Carl Sundakoff, and (Lt. Col.) Alex Waxler

It is the tremendous number of point impacts per second which provides the rapid, vibrationless cutting in the ultrasonic process. In the case of a cutting tip one-sixteenth inch square, there are approximately 9,000,000 of these point impacts per minute as compared to 300,000 point impacts per minute with the diamond wheel, or 800 point impacts in the case of a one-sixteenth inch bur rotating at 6,000 rpm. Ultrasonic cutting, as a result, is perfectly smooth, and no additional finishing or polishing is required.

These vibrations are transmitted at optimum effectiveness along any curve or angle. Thus tips may be used to reach and operate on any part of the tooth with ease and efficiency. The cavitips can also be used to penerate vertically or extend laterally in any direction, thus extending the outline of the cavity preparation. Tactile control is fully maintained at all time with the instrument since the butting tip, through the medium of the cutting compound, is in continuous contact with the tooth.

No Special Training

The dentist utilizes his present skills and can adapt his technic to the ultrasonic dental drill with a minimum of practice. There is no need for special training courses, and a little time spent working with the ultrasonic dental cutting tool on extracted teeth should provide the proficiency necessary to begin work in the mouth. After a period of actual experience in the oral cavity, one can efficiently perform almost every operative procedure satisfactorily.

The foot-control is very similar to the usual dental rheostat. Moving the pedal to the right activates the handpiece and the flow of cutting compound. The operator may select the cutting compound for enamel, dentin, leathery type caries, and the removal of all restorative materials except gold. Moving the pedal to the left selects water alone for rinsing the operative field or for use with prophylaxis instruments, root canal instruments, and with spoon excavators for soft caries removal. By pressing the button on top of the foot-control, the operator may select dry vibrations for drying root canals before filling, for packing and condensing amalgam and gold foil restorations, and for the seating of cast gold restorations when cementing.

Cutting action is started by a light touch and very gentle pressure is maintained against the surface of the tooth to be cut.

Ultrasonics Handpiece

The ultrasonic handpiece weighs approximately seven and a half ounces, and optimum cutting is obtained at a pressure of three to five ounces.

Another important feature is that the operator always retains complete tactile control with this unit. The cut is a precise reproduction of the shape of the cutting tip used, and the walls, floors, and margins of the cavity preparation all have an unusually smooth finish with nice sharp corners. For this reason cuts can be readily made by using appropriately shaped tools.

Like all cutting tools, the stainless steel cavitips exhibit a tendency to wear because the abrasive mixture acts upon them as well as upon the surface of the tooth being cut. But it takes only a few seconds to resharpen the end of the cavitip with a carborundum stone disk. From four to six preparations may be made with each cavitip, providing the tip is refaced as indicated.

These cutting tips are classified as follows:

1. Boxing tips — for opening and ex-

tending cavities and making proximal steps.

2. Slicers — for crown preparations and extending cavities.

3. Cylinders — for opening and extending cavities, for finishing, and the smaller ones for undercutting and retention points.

4. Gingival tips — for gingival preparations, labial, buccal, or lingual.

5. Retention tips — for making undercuts for added retention.

6. Bevel tips — for beveling margins, and for the removal of labial of anteriors in crown preparations.

7. Root canal tool — for holding standard broaches in root canal therapy.

8. Spoon excavators — which can be used with water alone to remove soft caries.

9. Periodontal tips — for scaling and curettage; shaped exactly as the conventional hand instruments for the same purpose.

The cutting compound, a mixture of 15% to 20% aluminum oxide in an air-water mixture, must be evacuated from the patient's mouth while operating.

Ultrasonic vs. Other Methods

The ultrasonic dental unit efficiently fulfills all accepted requirements of sound dentistry. At the same time, by eliminating gross vibration and by minimizing heat and noise, this instrument significantly reduces patient tension and apprehension and minimizes the pain and discomfort which ordinarily accompanies rotary instrumentation.[9,10]

In order to evaluate a new technic or instrument properly it is usually acceptable to compare it with existing methods or instruments. Conventional dental engines produce rotary speeds in the range of 3000 to 6000 rpm. High-speed technics have made available dental engines with rotary speeds up to 20,000 rpm. These latter are employed with a water spray for cooling purposes and are in rather limited use by the profession at the present time. Some experimental work has also been done recently with turbine driven handpieces, capable of achieving ultra-centrifugal speeds as high as 45,000 to 60,000 rpm, and a special engine-driven handpiece is now available which can be made to attain 150,000 rpm.

Rapid Cavity Preparation

The aim of the dentist has always been to achieve rapid, accurate cavity preparation with a minimum of discomfort to the patient. The minimizing of biological and psychological after-effects upon the patient is also of grave concern. Both operator and patient are constantly aware of the grinding noises and vibrations accompanying the application of rotary instruments as well as the postoperative discomfort which invariably follows excessive pressure or heating due to mechanical friction. The levels of vibration, noise, mechan-

The ultrasonic handpiece

ical pressure, and frictional heat, therefore, are fundamental to the evaluation of any dental technic.

Work performed at the National Bureau of Standards in conjunction with the United States Air Force has demonstrated that gross vibration and noise due to a rotating dental bur arise from two major sources: First, the eccentricity in the rotating element, which results in a series of low frequency blows to the tooth. Second, the higher frequency vibration from the successive impacts of the individual blades of the bur on the tooth.

Evidence points to the fact that as the number of successive contacts per second rises, and the impact of each individual contact is decreased, the discomfort experienced is reduced. In the case of the ultrasonic cutting tool the tip reciprocates approximately 29,000 times per second over a distance of only .0014 inches. A characteristic gentle hissing sound is the only audible component accompanying the ultrasonic cutting process.

Silent Process

The ultrasonic method of cutting teeth is essentially a silent process, characterized by the low speed of impact of the individual cutting particle and a large number of such impacts per second. As for mechanical vibration, pressure, and frictional heat, microscopic experiments have shown that very little, if any vibration, should be felt in ultrasonic tooth drilling.

These observations regarding the ultrasonic dental unit are borne out by the almost unanimously favorable reaction of 1,786 patients of both sexes upon whom some 3,100 operative procedures have been successfully performed with the ultrasonic dental unit during the period covered by this report (September 1954 - February 1956).

A statistical breakdown of these procedures by class would be:

Class I	1,013
Class II	945
Class III & IV	371
Class V	745
Gold crowns	9
Jacket crowns	15
Prophylaxis	9
Miscellaneous procedures including packing amalgams, seating gold restorations, removal of jacket crowns, root canal therapy, etc.	

The patients invariably described the sensation experienced as "vibrationless," "smooth as velvet," "soothing," "like nothing at all was happening," etc.

Significant evidence, testifying to the comfortable nature of ultrasonic dental preparation as compared to former patient experience with rotary instruments, is found in the marked reduction in the use of anesthesia during this fifteen month period of work with the ultrasonic instrument. More than 75% of the patients operated on with rotary instruments by the Research Group have required anesthesia. With the ultrasonic dental preparation, however, anesthesia was used for only 6% of the 1,786 patients.

Special Characteristics

It is interesting to observe that the special characteristics of the ultrasonic handpiece are such as to guarantee the transmission of a minimum of heat and trauma to the tooth during proper use of the instrument. The mechanical pressure or force applied to a cutting instrument is controled by the operator, and, as Peyton and Henry[11] pointed out, the operator tends to adopt the pressure which produces the most efficient cutting.

The ultrasonic dental handpiece cuts best when operated under extremely light pressures; these are substantially less than pressures employed with the rotary instrument. This holds both for enamel and dentin removal. Since the cutting compound is a water mixture and is essential to ultrasonic cutting, a cooling effect is automatically present, thus reducing frictional heat to a minimum.

Frictional Heat

With the rotary tool, the amount of frictional heat generated depends in general upon the rotational speed and sharpness of the cutting elements of the bur or disk, the cutting pressure, and the presence or absence of cooling water. Thus, with the rotary instrument frictional heat is very much a function of the operating skill, care, and technic of the dentist. Even the water spray is at the dentist's option in a majority of cases.

The general care of the handpiece is also different in the case of rotary and ultrasonic instruments. The ultrasonic handpiece, since it operates resonantly, cannot introduce auxiliary frequencies due to eccentricity, lack of alignment, or similar mechanical aspects of rotary instruments. The only basic requirement of good care is the maintenance of cleanliness at the thread where the cutting tip is attached. There are no moving parts to oil or maintain in order to prevent the development of unwanted vibrations.

It also may be valuable here for us to compare the ultrasonic unit with the air abrasive instrument, with which some skilled operators obtain excellent results. (We have also worked with the air abrasive technic since one of our members has this instrument.)

These are some of the conclusions drawn in our comparison between the ultrasonic and the air abrasive units:

1. Maintenance of tactile communication at all times with the ultrasonic handpiece enables the operator to maintain complete control and to obtain far greater precision than is obtainable with the air abrasive tool.

2. Dry abrasive which may be inhaled by operator, assistant, or patient and leaves a fine dust over the office, is present with air abrasive but not with the ultrasonic tool.

3. There is routine need of a rubber dam or some form of matrix to prevent adjacent teeth from being etched with the air abrasive instrument, whereas the carefully used ultrasonic instrument does not require the use of any protective matrix or dam since it cuts only where it touches.

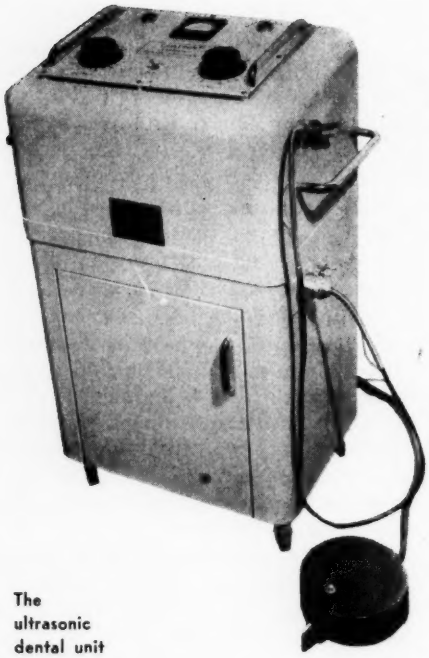
4. The air abrasive unit is considerably more bulky and emits a far louder noise from the vacuum apparatus than the ultrasonic unit. It is the considered opinion of our research group, therefore, that the ultrasonic dental unit has many distinct and important advantages over the air abrasive instrument for routine cavity preparation in the dental office.

Advantages vs. Disadvantages

We might summarize the advantages and disadvantages of the ultrasonic unit over the rotary unit in routine dental practice—as we have found them—as follows:

There is a noticeably increased patient relaxation as contrasted with the tense apprehension so typical of rotary instrument operation. Anesthesia becomes the rare adjunct rather than the routine necessity.

Evidence of considerably less sensitivity is immediately apparent. Even those patients who had previously always requested local anesthesia for



The ultrasonic dental unit

cavity preparation exhibited little or no pain when convinced to try the ultrasonic cutting tool without anesthesia. When some pain was evidenced, it was invariably described as quite "bearable." This method of cutting appears to be kinder to the hard and soft tissues of the mouth as indicated by a marked reduction in postoperative sensitivity to thermal and electro-galvanic shock.

Patient Acceptance

Once having started the preparation with the ultrasonic tool, no patient desired to return to the rotary instrument for completion and upon repeated subsequent operations, the patients' reactions were even more favorable, possibly indicating that a psychosomatic factor had entered the initial exposure to the new technic of cutting.

Whenever a comparison of the two methods was made in the same individual—by using both in one cavity or one for one cavity preparation and the other for a second cavity preparation—a definite dislike was exhibited toward the rotary method.

Fatigue Factor

The fatigue factor for the dentist himself was reduced considerably, since the handpiece exerts no torque and does not run, skip, or slip with possible soft tissue damage resulting.

It must be stated, however, that unnecessary, excessive pressure by the operator can create painful heat in the tooth being operated upon, as well as in the soft tissues touched by the tool under pressure.

Also, the residue of aluminum oxide (cutting compound) collecting in the floor of the mouth is a little unpleasant and requires more rinsing than is necessary in the water spray associated with the rotary technic. This may present a problem with young children.

What, then, is the overall picture? Patient reaction is overwhelmingly favorable while dentist reaction is only a little less enthusiastic. The process has apparently unlimited potential, but each dentist must evaluate for himself which considerations are most important: the rising tide of patient acceptance and service to mankind, or the factors of speed and early economics which present somewhat of a problem to the operator. Rotary instruments have been in use for many generations, ultrasonics in dentistry for only a few years.

To summarize, the Ultrasonic Dental Research Group of Chicago feels this instrument can be used very effec-

(Continued on page 795)

PRESIDENT'S PAGE

by Thomas C. Starshak, D.D.S.

The Illegal Labs' Appeal

On October 15 the United States Supreme Court refused to hear the appeal of the illegal laboratories from the decision of the Illinois Supreme Court—the decision which prohibited dental laboratories from dealing directly with the public, and also from any form of advertising which showed intent to deal directly with the public.

Naturally, every ethical dentist in Illinois was elated to learn that the illegal laboratories were ordered to abide by the law or go out of business. Our victory was, however, short lived. On October 23 the attorneys for the advertising laboratories petitioned the United States Supreme Court for reconsideration to hear the appeal from the decision of the Illinois Supreme Court. Our attorneys feel that this petition will also be denied by the United States Supreme Court, but it will delay the action of the court injunction against the twenty-four laboratories involved. It will also serve as a basis for pleading their case on the floor of the legislature when they re-introduce a bill similar to H.B. 1118 to amend the Dental Practice Act.

The following are quotes from the petition:

> "The Illinois Dental Surgery Act inhibits petitioners in the making of dentures. It pretends to regulate them without setting standards with which they may comply, without fixing requirements which they may meet, without provision for recognizing or licensing them in any way. Petitioners are forbidden to carry on their occupation except where they are employed exclusively by dentists. If one is so employed, his work is made legal; if there is no such employment, the same work becomes illegal—even criminal. The dentist class is given imperial powers—not constitutional ones. . . .
>
> "The Illinois law makes it illegal for those whose livelihood is making dentures to deal with any persons other than a relatively small but highly organized group—the dentists. . . .
>
> "The Illinois Act masquerades as a public health measure. While the statute may bear on matters of public health, its principal effect is to give dentists an arbitrary economic power unprecedented in our law. If public health were the prime consideration, this could have been achieved by accepted forms of regulation—setting up definite standards of schooling, training and supervision. It could have provided for pre-

scription of dentures by dentists and final approval of the work without giving the dentists the life and death power that they now have over dental technicians."

In order to again defeat this adverse legislation, we NEED YOUR HELP both politically and financially . . . especially if it is deemed necessary to raise State Society dues. This may prove the only really effective means of preventing illegal dentistry in Illinois in 1957.

• • •

1956 has been a very interesting year. Your officers were confronted by many problems which, I hope, we settled to the satisfaction of all members. There were also several changes as to procedure in order to keep abreast with the progress in our profession. I have attempted to keep the members informed of what was happening in your Society at all times. If I have succeeded, I am pleased.

At this time I wish to thank every member for his support, and also to wish each and every one a

MERRY CHRISTMAS AND A HAPPY NEW YEAR.

Illinois Dental Assistants Page

by Margaret Crosby, President

I know everyone is very busy with their work, plus all their plans for the Christmas Holidays, but I do feel this is the time to remind our members about completing their plans for our next meeting which will be held at the Conrad Hilton Hotel, Saturday and Sunday, February 2 and 3, 1957.

Our program chairman, Maurine Wheeler, has been very busy formulating a most interesting program—just for us—the members of the Illinois State Dental Assistants Association. Dorothy Sutton and Grace Dymer are lending their valuable assistance to Maurine by serving as local arrangements chairman and co-chairman.

The Chicago D.A.A. are in the progress of planning another dance for us to be held on Sunday evening, February 3, and I know everyone will want to attend. More news will be forthcoming so be sure to keep that evening open so that you can attend.

All component presidents have had a request from Juanita Doeding, clinics and posters chairman, which I trust was presented to all members, urging them to present clinics and posters at the February meeting. Juanita has worked very diligently as head of the committee, so won't you show your appreciation for her efforts by contacting her and saying you will give a Clinic on February 3.

Mabel Carlson, president, Rockford, D.A.A. is proud to announce that they now have a new 104-hour extension study course in progress with sixteen members participating.

Our newest component, Centralia Dental Assistants Society, plans to start its study course in the very near future. Good luck to these girls.

The Officers of the Illinois State Dental Assistants Association join me in wishing you and yours the joy and blessings of this Christmas season.

Air Abrasive

by Warren Willman, D.D.S., M.S.

EVERY dentist is aware of the aversion patients show towards the dental handpiece. Reactions range from a slight, stoical stiffening to outspoken and even cringing resistance. Few dentists, however, are aware that they themselves become tense whenever the patient does, quite involuntarily and unavoidably.

A major improvement was introduced over forty years ago with the discovery of novocain, which made it possible to obtund the concomitant pain; more recently the handpiece itself has been improved in several ways and in some instances its speed has been increased. It may be doubted, however, whether these changes have actually made it a great deal more acceptable to the patient.

Development by Black

The first man to devise an entirely new method for removing hard tooth tissues in the preparation of dental cavities was Dr. Robert B. Black, who used his original air abrasive apparatus on a patient in 1942. The method was developed with the aid of a few other cooperating dentists and five years of constant effort by dental equipment engineers. It was presented to the dental profession in 1950.

The interest aroused at that time will not be soon forgotten. Had the equipment been easily and quickly available, it seems probable a large proportion of the profession would have attempted to use it at once. Fortunately it was foreseen that such a procedure would have been calamitous, so it was made a requirement that a dentist receive special training before venturing to use the method. This restriction, plus several months' delay in producing the equipment, had the desirable effect of permitting excessive enthusiasm to cool. Only those who genuinely desired to take up the technic, after sober reflection, then began to use it.

Evaluation of Experience

There is no substitute for experience. Between six and seven years ago I was asked to speak before several dental audiences, most of them unusually large, on the subject of air abrasive. I spoke necessarily and, I believe, quite frankly, on the basis of a rather scant experience with the technic. I therefore welcome this opportunity to evaluate the method after using it continually in daily practice for nearly seven years.

It is customary to speak of advantages and disadvantages. But here it seems there are not many disadvantages, but rather several obstacles. Among the minor obstacles the cost of the equipment (although this is eventually regained by the increased volume of work done and the increased value to the patient), the space requirements of the equipment in the office (this has prevented some dentists who have been trained and who want to use air abrasive from installing it), and the requirement for alternating current (convert-

ers of adequate size are no longer manufactured and are almost impossible to obtain).

The major obstacle to the use of air abrasive is the need of the dentist to acquire an entirely new skill. This alone, it would seem, limited its use at the outset to a relatively small group and continues to restrict its increasing employment to a small trickle. This is augmented by the demand for dental service today; dentists feel less impelled to spend time on added study when they find it easy to attract patients without doing anything to make dentistry more palatable.

In my experience air abrasive has achieved far more than appeared possible at first. It has largely replaced the use of rotary instruments (except for sandpaper discs, brushes, rubber cups, and the like) and has not greatly increased the need for using hand instruments. Every type of cavity has been prepared with it, in every tooth surface in which it might occur; preparations for full and three-quarter crowns, porcelain jacket crowns, pinledge inlays, and slice-lock attachments have been made with it; amalgam, plastic, and silicate fillings have been removed with it as well as gold inlays, porcelain crowns, and gold crowns of various types. Bridges have been cut, when necessary, at the soldered joints or through the centers of abutment crowns if desired. (Cutting gold at a practical rate of speed is also possible if helium is used as the gaseous propellant, which will be discussed later.)

Response of Patients

The response of patients to the method has been exceedingly good, but is not always uniform. Air abrasive, as far as we can determine, is always less painful than a bur in any given cavity, but in some instances it does cause pain. Naturally a patient with such experience is less enthusiastic than those who feel nothing while the cavity is being prepared. If a patient does feel pain, local anesthesia is used thereafter, assuring operations with no sensation whatever.

Absence of Heat

Since no heat is evolved, the operator does not need to keep himself alert to the danger of overheating a tooth, as is the case with a bur. It is often noticed that an apprehensive patient, especially one who has had much dental treatment previously, may not become relaxed with air abrasive until the third or fourth sitting. Apparently it seems too good to be true, at first, and two or three successive experiences are necessary to permit him to believe dental operations can actually be so different from his past remembrance. Patients who have had several preparations made with air abrasive frequently fall asleep while it is being used. (From my own experience as a patient, it seems quite possible that the steady drone of the suction hood may have a soporific effect.)

As Dr. Black stated in one of his first papers, air abrasive is not a cure-all. A dental operation is still an operation. It is inconceivable that it could ever be a true pleasure, but air abrasive can make it immeasurably less unpleasant. Appreciation is a quality born solely of contrast; the most appreciative patients, as one would expect, are those who have had the most disagreeable previous experience with dentistry coupled with the most successful experience with air abrasive. For the dentist himself, an operation is still work, but it is easier once the technic is thoroughly mastered; also there is a subtle element of fun in it, like that evoked by any game of skill.

Even after seven years' habituation it still retains a trace of magic; as a classmate stated, one seems to be a spectator as the cavity takes form, rather than the actual operator. In my own experience a curious reversal has occurred. Formerly, pushing aside the handpiece at the end of a cavity preparation was not only a signal for the patient to relax somewhat, but also for me to feel that the most intense part of the work was past. Now the preparation of the cavity is more exhilarating and the subsequent restoration of the tooth a bit boring by comparison.

Compendium of Technic

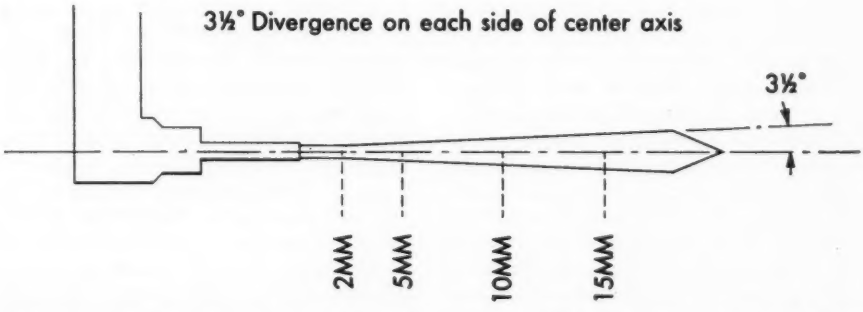
A brief compendium of the method and technic seems desirable here, both for the recent graduate (who should logically be most interested in air abrasive because of its attractiveness to patients) and for those who might have missed the concentrated demonstrations and discussions a few years ago.

Air abrasive is a non-mechanical means of cutting dental hard tissues and several dental materials through the use of a finely focused stream of abrasive particles (Figure 1) propelled by a dry gas (originally air, but now normally carbon dioxide). The pressure at the nozzle tip is usually about eighty pounds to the square inch; the abrasive used is aluminum oxide, carefully graded to a particle size averaging twenty-eight microns.

Stream of Abrasive

The abrasive particles leave the nozzle at a velocity of 1200 to 1900 feet per second with carbon dioxide used as the propellant, but this may be increased by the use of lighter gases. It is a well known characteristic of flying abrasive particles that different substances are cut at varying speeds, the harder being cut the more rapidly. Thus air abrasive cuts enamel slightly faster than dentin while soft tissue is almost unaffected. The mass of the abrasive particles is so small they lose most of their inertia on the first rebound; for this reason virtually no cutting of tooth structure can be observed except at the site of initial impact.

The crux of the method lies in the fact that the shape of the cut made by the abrasive stream varies as the distance between nozzle and tooth is varied. If the nozzle is moved in a straight line close to the tooth surface, a thin cut is produced like that of an ultrathin carborundum disc; if the nozzle is held a little farther from the surface, the walls of the slit diverge slight-

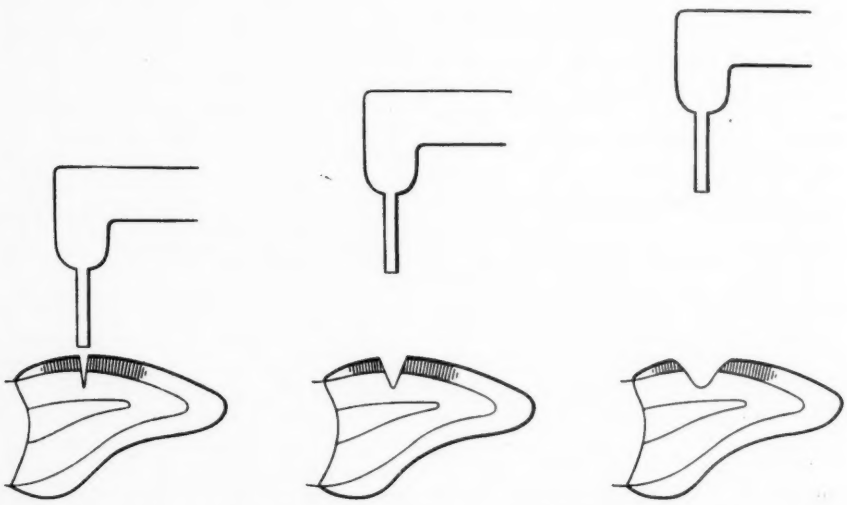


(Figure 1) Abrasive stream in the air abrasive process showing 3½° divergence on each side of the center axis.

ly, as though a pointed tapering fissure bur or stone had been used; if the nozzle is held some distance from the surface (let us say about fifteen millimeters), a wide V-shaped trench will be cut without sharp angles at the bottom or at the surface (Figure 2).

teeth, is necessary in order to develop skill and ease in utilizing the various cuts to produce the desired cavity forms.

A softer abrasive (dolomite) is provided in the apparatus which, used at reduced pressure, does not cut tooth



(Figure 2) The types of cuts made when the handpiece nozzle is held at a 90° angle to the tooth surface and moved back and forth on a line. It also shows how the diameter of the cut increases as the nozzle tip distance from the tooth surface is increased.

By combining these various cuts it is possible to approximate closely any type of dental preparation. In many instances a moderate amount of hand instrumentation or a small amount of rotary cutting may be needed to make them indistinguishable from preparations made by conventional methods.

Speed of cutting is controlled by varying the amount of abrasive fed into the gas stream. Cutting is started or stopped by a single foot switch. Air abrasive is, in fact, a kind of three dimensional air-brush; one almost literally paints the cavity into the tooth. The initial learning period, devoting some hours to practice on extracted

structure appreciably but which rapidly removes supragingival calculus, tars, stains, and pelicles from tooth surfaces —including tightly overlapped areas, fissures, and chipped spots which cannot be readily cleaned by any other method. If subgingival calculus is present, it needs to be removed by scaling, but this becomes relatively easy when the bulky overlying calculus is already gone. In fairly clean mouths this use of air abrasive is of no particular advantage to the patient or the dentist, but in mouths with medium to heavy visible deposits, it is a boon to both, sometimes verging on the spectacular.

The use of a thin disc of water-clear

synthetic sappire, cemented on a front surface rhodium mirror, has brought to a swift end the problem of fogging or etching which made conventional mouth mirrors impractical.

Aside from the fact that a new skill must be learned and that more, rather than less skill is required, two chief criticisms are leveled at air abrasive: that it is not practical, and that it does not do as good work as rotary instruments. Let us consider these separately.

Practicality as a Hobby

From my own experience and that of my friends who use air abrasive, it may be said that air abrasive is entirely practical if the dentist really wants to make it so. This is much like saying that golf or photography is practical as a hobby. Both require expensive equipment and long, arduous practice before satisfying skill is attained, but both are obviously practical *if* the hobbyist has a genuine desire to exploit them. Then, like air abrasive, they are fun from the first fumbling start all the way up to expert performance. If a dentist wants to treat his patients without encountering the resistance associated with the handpiece, if he wants to avoid the physical tension this generates in him as well as the patient, if he wants to work rapidly and see cavities appear in teeth when he merely points at them, then air abrasive will be practical.

If, when we speak of doing good work in dental preparations, we identify goodness with exact geometricity, obviously air abrasive will fall short of what can be done with rotary instruments. One cannot expect to draw a circle free-handed as precisely as it can be scribed with a compass. But preparations made with air abrasive can approach quite closely those made with rotary instruments, and a small amount of additional instrumentation can bring them quickly to any degree of textbook perfection that may be desired.

It should also be pointed out that there are several situations in which air abrasive does better work than conventional instruments.

Penetrating enamel, especially in small areas. A prime example is an anterior tooth with an acute abscess at the root apex, making the tooth exquisitely painful to touch. In this instance air abrasive is incomparably superior to any other technic.

Following out decalcified or precarious areas, particularly on smooth surfaces. Whether the rubber dam is used or not, the dehydrating action of the dry propellant gas and the constantly visible area ahead of the cutting makes air abrasive exceptionally efficient and rapid for this purpose.

Elimination of Incipient Caries

Polishing off incipient caries, either on an exposed surface or the proximal surface of a tooth adjacent to a newly opened cavity. This is an old idea that has been largely abandoned because it did not work—with conventional instruments. With air abrasive, because of its ability to reveal the minutest degree of decalcification and because of its selective penetration, it will either be successful or immediately make it apparent that the decalcification has assumed a form requiring it to be handled as active caries.

Immunizing pits and fissures, in the technic advocated by Hyatt in the practice of prophylactic odontotomy. Not only does air abrasive do this better and more rapidly than rotary instruments, but it makes easier and surer the detection of those areas that require the complete odontotomy. Needless to say, it excels in the latter also.

Removing cement from a cavity pre-

paration without marring or altering it. It happens occasionally that a preparation, for which a pattern or casting has already been made, has to go for many weeks before being restored (usually because either patient or dentist is going to be away during that interval), and it is desirable to close it with regular zinc cement. This can later be removed without danger by air abrasive, using dolomite as the abrasive.

Cutting without Cracking

Cutting porcelain or amalgam without danger of cracking. Opening through a porcelain jacket crown for access to the pulp canal is an obvious example. In dove-tailing one amalgam filling into a previous one it often happens that a somewhat narrow portion of intact amalgam is designed to be left remaining along one wall of the cavity. A rotary instrument will sometimes accidentally dislodge this. Since there is no vibration produced by air abrasive and no tendency to hook or chip the material being cut, this danger is obviated.

Reducing incisal edges, especially of lower anterior teeth. In periodontal treatment it is frequently necessary to shorten the lower anterior teeth because they have erupted abnormally and/or abraded insufficiently, causing excessive leverage on an already weakened attachment. When this is done by any type of rotary instrument (a wet carborundum disc is usually the most humane), it is not only abhorrent to the patient, but nearly always the operator is obliged to stop short of the desired level (often several millimeters) because the teeth become sensitive. Anesthesia is of no avail here because if the teeth are cut further, they remain sensitive indefinitely and the patient complains bitterly.

I do not know why, but I have not once encountered any sensitivity in this situation when I have used air abrasive, even in the most drastic reduction. Naturally this technic also applies where a slight reduction is required to accommodate a crown or bridge being constructed in the opposing arch, with the added advantage that it may often be done without the patient's knowledge (since there is no tactile stimulation he never knows what tooth is being worked on).

Massive reduction of teeth, particularly molars. In restoring neglected mouths it is frequently desirable to reduce a molar or bicuspid by as much as half its crown in order to establish a better occlusion. When this is attempted by rotary instruments it is again observed that it often stops short of the intended level, not because of sensitiveness but because of sheer fatigue on the part of the operator coupled with his awareness of the rising resistance of the patient to the incessant grinding.

Deposits on Overlapped Teeth

Removing deposits and stains from tightly overlapped tooth surfaces and fissures with dolomite has already been mentioned. Air abrasive can reach locations in this way that have previously been inaccessible by any other means known to dentistry.

In addition to these and other situations in which air abrasive does better work than conventional instruments, it should be mentioned that it has several ancillary uses, largely in the laboratory. Porcelain denture teeth that have been ground, for whatever reason, so as to have lost most of their occlusal conformation can be reshaped by a special technic that is so quick and easy that it appears to be a trick.

Cavities for mock fillings or inlays in

The Author: Dr. Warren Willman attended James Millikin University 1921-1923 and received his M.S. degree from Loyola University in 1925. He graduated from Loyola University School of Dentistry in 1927 and began teaching at the school the same year. He was the editor of the *Bur*, 1944-1950, and retired as professor of operative dentistry in 1949. Since that time he has been engaged in the private practice of dentistry.

The author of a textbook on periodontia in 1938, Dr. Willman has also been the author of numerous scientific articles; he has spoken before numerous dental groups and is considered one of "the" authorities on air abrasive.

Dr. Willman is a member of the American Dental Association, Illinois State Dental Society, Chicago Dental Society, Federation Dentaire Internationale, Odontographic Society of Chicago, International Association for Dental Research, and American College of Dentists.

porcelain denture teeth may be cut more easily than in natural teeth. The inner surface of castings are cleaned of oxides instantly and dulled so that any spots which impinge, when seating on an amalgam die, for example, are revealed at once. These may be relieved and dulled repeatedly if necessary. The inner surface of porcelain jacket crowns, highly glazed when the platinum foil is removed, may be dulled for more secure cementation, without danger to the margins.

Cleaning Cement

Cement and debris may be quickly removed from old inlays, crowns, and bridges that have been removed from the mouth, leaving them with the appearance of new castings. Minute bits of foreign material between gold surfaces about to be soldered are easily removed leaving ideal surfaces for soldering. Portions of an investment or of a cast may be removed with no possibility of jarring or nudging adjacent objects.

One even finds non-dental uses for air abrasive, such as making or resurfacing ground glass for cameras, duplicating designs in replacing etched window panes, and so on.

Misleading Omission

It is curious but true that while dental programs perenially have papers and clinics on many standard subjects, once air abrasive has been presented and shown in clinics, there is nothing more to tell or show. This may have misled some into thinking that its use is waning. This is not true, but its use will always be limited to those who have the skill and the genuine desire to employ it.

YOUR DUES
ARE DUE

Payable by January 1, 1957. Please try not to let your membership and Journal subscription expire.

President Starshak Presents Gavel

from g. v. black's farm to st. louis dental society

The following are excerpts from the speech given by Dr. Thomas C. Starshak, when presenting the gavel shown below to Dr. Paul A. Ebeling, president of the St. Louis Dental Society. This was during the Centennial Mid-Continent Dental Congress in St. Louis, Missouri, November 25-28.

Recognition of the St. Louis Dental Society's centennial in this manner was made possible by our State Society's History Committee under the chairmanship of Dr. James E. Mahoney.

The year after your Society was organized, a certain young dentist began practicing in a small town in Illinois. He traveled many miles by any available means, even by foot, to attend your professional meetings. Although without formal education and without a degree in dentistry, his abilities were soon recognized by your group, and about the time he invented the dental engine, he was appointed professor of pathology at the Missouri Dental School, where he later received his degree, in 1878.

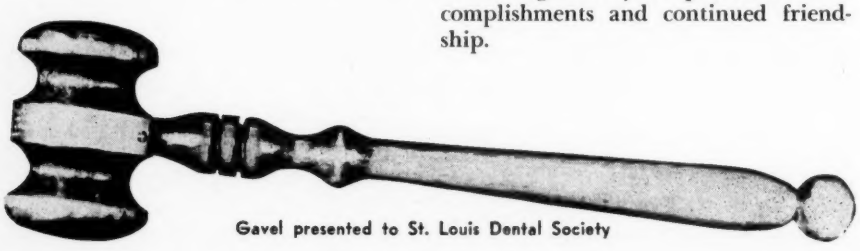
It is coincidental that the theme you have chosen for your centennial, "Better Health through Dentistry," was the very subject of a series of articles this man wrote and published in 1867 in the *Jacksonville Journal*. The thoughts he expressed then are those advocated today. He also believed that it was the duty of the dentist to teach the public good dental hygiene and care, as only a dentist can teach them.

He was a member of the Missouri Dental Society in 1866, and two years later he became a member of my own Illinois Dental Society . . . . So you of Missouri and we of Illinois can proudly claim co-ownership of this great man.

It is fitting, then, that this gavel which I hold in my hand, should be fashioned from a tree grown on this man's farm, where he lived in his youth as a pioneer, and where he died —an honored teacher, scientist, and the "father of modern dentistry."

It is inscribed as follows: "This gavel is made of walnut from the G. V. Black Walnut Grove near Virginia, Illinois. And the case is inscribed, "St. Louis Dental Society, 100th anniversary, 1856 to 1956, from the Illinois State Dental Society."

It is my privilege and pleasure, as President of the Illinois State Dental Society, to present this gavel to the St. Louis Dental Society as a symbol of a long history of professional accomplishments and continued friendship.



Gavel presented to St. Louis Dental Society

hydraulic turbine contra-angle handpiece

This unit consists of a mobile cabinet containing a fluid pumping mechanism, a reservoir, a pressure switch, a solenoid valve, and distributor lines. The contra-angle is quite similar in size and shape to the standard dental contra-angle, and flexible coaxial double tubing connects it to the unit.

The unit is self contained and needs only to be connected to an electrical outlet for operation. The fluid is stored in the reservoir tank and used over and over; thus, the unit requires no adjustment during its normal operating use. The pumping equipment is enclosed in the sound-insulated cabinet, which minimizes undesirable noise during the operation.

The handpiece is driven by a small turbine in the head of the contra-angle, with the cutting tool attached directly to the shaft of the turbine. This turbine has six notched blades fixed to the shaft, and plastic bearings are used in the turbine. These need no lubricating, are very quiet, and are easily and rather cheaply replaced by the operator. In addition, the handpiece can be sterilized completely assembled.

The cutting instruments themselves are not standard ones, but are made especially for this turbine handpiece and are hollow shafted. The turbine shaft fits into the hollow shaft of the cutter and is held with a spring key attachment fitting into a keyway in the instrument.

Since the only rotating element in the contra-angle is the turbine to which the cutting tool is directly attached, the vibrations due to the belt-and-gear driving mechanism of the conventional contra-angle are eliminated; the fluid passing over the turbine and shaft acts as a coolant. In spite of the high rotational speed developed, overheating of the instrument is prevented. This instrument, therefore, has a distinct advantage over the gear-type instruments which heat excessively at high speed.

The rotational speed depends upon the amount of fluid forced past the turbine in a given amount of time, and the torque is proportional to the pressure of fluid passing through; 1.6 gallons per minute produces a speed of 61,000 revolutions per minute.

A two ounce radial load, or extremely light pressure, is recommended in cutting. A 3½ ounce load will stop the rotation; this is a notable safety feature because the instrument does not develop enough torque even to enmesh rubber dam to any extent.

All the cutting tools used at these high speeds must be accurately balanced; any eccentricity causes vibration. Silicon carbide mounted points and diamond disks of medium grit are

Digested from "Hydraulic Turbine Contra-Angle Handpiece" by Robert J. Nelsen, D.D.S., Carl E. Pelander, and John W. Kumpula of the National Bureau of Standards, Washington, D.C. J.A.D.A. 47:324-329, September, 1953.

most efficient.

Because of the light pressures used, preparation of teeth can be performed with very little strain to the operator, and the cutting tools do not tend to climb or roll out of the cavity as they do at slower speeds. The use of this equipment requires no special training as it functions much like standard equipment. Although milling cutters, such as steel and carbide burs of current design, do not function well in this hydraulic handpiece, grinding tools, such as silicon carbide and diamond points and disks, cut with exceptional efficiency in this handpiece.

• • •

For one reason or another, users of the hydraulic turbine handpiece have been somewhat reticent about reporting their findings. Several dentists in the Chicago area were requested to write on this subject, but felt they had not used the handpiece long enough to do so.

And yet, in the laboratory, results with the unit are quite satisfactory. A recent report discussing "experimentation on methods of cutting enamel" by Drs. Ralph W. Phillips and George C. Paffenbarger includes the following statement:

"The method that appears to be the most promising at the present time makes use of the water turbine handpiece developed by Nelsen and associates."*

As the youngest member of the high-speed family, the hydraulic turbine handpiece is recognized as potentially important, but its practicality in the daily routine of the general practitioner still seems to be "on trial." Unlike the comparatively simple conversion of rotary units to high and super speeds (effected with the new handpieces, pulleys, etc.), the water turbine process requires a completely new unit. This is perhaps another reason why more dentists have not had the opportunity to use the process and why the hydraulic turbine handpiece has not yet come into the foreground in dental literature.

*Phillips, Ralph W., and Paffenbarger, George C. Research on dental materials. *J.A.D.A.* 52:426-428, April 1956.

CHRISTMAS 1956

The Infant waits in the manger,
but hate rules the world.
Shepherds carry carbines,
and the Magi cannot cross the Canal.
His enemies build walls of bullets
and wire, miles wide,
to keep men of good will away;
to keep Him out.

The Infant waits in His manger,
again this holy eve.
Perhaps next year—or even the next—
the Christmas star will see
churches with bright, open doors
in lands now drenched in blood . . .
and men of good will living in peace,
free to adore Him.

COMPONENTS

EASTERN ILLINOIS

The Mattoon Dental Society held its regular meeting November 7, and it included a preview of the December program of the Eastern Illinois Dental Society. Those present heard a tape recording of Dr. David Torch speaking on children's dentistry. Dr. Torch, who will be the clinician for the EI meeting, is a pedodontist from Chicago.

Henry Gresens of Toledo, a frequent contributor of articles to newspapers and periodicals, was responsible for a timely message in a local newspaper on the eve of election day. In huge letters on the front page of the *Mattoon Journal Gazette* appeared the following statement: "Vote, you lucky Americans." Henry was highly praised and commended for his contribution in an editorial published in the same paper.

Dave Baughman, Amos Powell, and T. E. McMeekan of Mattoon; Edward Gates and William Tym of Charleston; and E. L. Brown of Arthur represented Eastern Illinois at the Decatur District Study Club Meeting in November.

Of this and that: We hear by way of the grapevine that several of our illustrious fellow travelers are planning winter vacations in Florida.

Troy Taber, formerly of Mattoon and now practicing in Bridgeport, reports he is contemplating opening an office in nearby Lawrenceville, in addition to his present location.

Lloyd Koepke, Mattoon's famous fisherman, is back from a fishing trip . . . minus fish!

Jerry Goetz is very busy these days attending clinics in Springfield and Jacksonville.

K. D. Davidson is flashing a brand new automobile. Make? Just a little short of a Continental II.

Your columnist spent a weekend recently in St. Louis visiting his daughters—Toni, a sophomore at Maryville College, and Willie, a junior at St. Louis University.

We mailed our letter to Santa Claus a long time ago with just one request. "Please, please, Santa—news from our fellow dentists. Santa, it's awfully hard to make up so much stuff!!"

Seasons Greetings!—*Bill Podesta*

Ed.'s note: We hope Santa fills your stocking, Bill.

WABASH RIVER

During my short span of five years' practice I don't believe Effingham has ever played host to a meeting of the Wabash River Dental Society. On October 11, however, they proved they were quite capable. There is always a certain amount of work involved in preparing for a meeting and in this case thanks must go to Drs. Milone and Starr who were the co-chairmen of the meeting. Also in passing out thanks, we want to give credit to their wives for entertaining the ladies during the afternoon and evening.

During the business part of the meeting Mr. Hoffman presented some informational material pertaining to dentists and social security.

Dr. David Porch from the University of Illinois presented a very interesting program on children's dentistry. The meeting was closed with an excellent dinner served at the Hotel Benwood.

I understand that A. Marshall of Albion is leaving to take a new loca-

tion in Florida. We hate to see him go, but I suppose that all of us would like to go with him.

Mary Meade of Carmi is still on the critical list at the Carmi Hospital. We missed her at our last meeting and we extend to her our prayers and best wishes for a rapid recovery.

—*Richard Kling*

DECATUR

The speakers for our Tri-District Meeting in November were Drs. H. B. Clark, Jr. of Minneapolis and Graham Davies of Chicago. Dr. Clark presented several excellent movies and numerous slides to illustrate the minimum essentials of oral surgery and recovery of root tips. Dr. Davies gave us a wealth of practical advice concerning the legal aspects of dentistry. Both the afternoon and evening sessions were well attended by the members of the Decatur, Eastern, and Illini components.

At the business session the applications for membership in the Decatur Society of William H. Clem and Francis J. Barker were presented. Clem is, at present, in service. Barker is practicing in Bement in the former office of Lewie Pelton. W. Dale Long was unanimously voted into our society. Our constitution was amended by a unanimous vote to eliminate the office of vice-president and substitute that of president-elect. Therefore, we know that the old professional politician (the Mayor) Spressor will be our next president.

At our January meeting we will be favored by the appearance of Richard V. Wills of Columbus, Ohio, whose subject will be "Prosthetic Problems in Partially Edentulous Patients." Dr. Wills is superbly qualified to bring us a fresh approach to this important phase of dentistry, and it promises to be one of the top programs of the year. All dentists in this area are cordially invited to attend and we hope to fill the Decatur Club Ballroom to overflowing. The meeting will begin Tuesday afternoon, January 8, at 3:00 p.m. Following the social and dinner, we will continue with an evening session. Remember the meeting date—Tuesday, January 8, 1957.

The Decatur Dental Wives met on November 1, for their usual luncheon and cards. Janie and Pauline Jurgens were hostesses. It sounds like a "put up job," as Janie won high in bridge and Pauline was high in canasta.

Bill Tener arrived home from North Dakota in October where he bagged his full quota of pheasants, rested up, and then took his annual trip to Pennsylvania to hunt deer. Bill Sunderman of Charleston, accompanied by his charming daughter Marguerite, a dental hygienist, called on Decatur friends recently; we were very sorry to hear that his wife had passed on in June. We certainly extend our sincere sympathy.

Goodwin is about ready to give up dentistry for a while to sell his Lion's Club raffle tickets. Sorry to hear Maras has been bothered by a back ailment. Spressor, who was resplendent in a new yellow shirt at the November meeting, has been pheasant hunting in Kansas.

On November 8 the Decatur Dental Assistants had a well attended meeting in the offices of Paul and Emmett Jurgens. Walt Winter discussed the 104 hour extension course leading to certification. Norma Jean Bell and Winona Smith were hostesses.

Edmund, the indefatigable, has become a "Midnight Casanova." Douglas has been sporting some rather violent looking lacerations on his forehead at the Walgreen table. His explanation was that his dog was so happy to see him on his arrival home (hour and condition unknown) he put his paws on Doug's shoulders and upset his balance.

This resulted in a fall against the house. To quote, "The dog is the only member of family happy to see me home."—*Emmett Jurgens*

DANVILLE

Our last meeting was held at the home of Lois and Bill Stowring when the Dental Auxiliary gave a Halloween party for the dentists and their wives. Almost everyone came masked. Wayne and Lajune Vaught were the most mysterious couple; they arrived early and were the last to unmask. Everyone was trying to guess who they were, but no one was too successful. It was only when they removed their masks that their identity was revealed. A fine meal was served buffet style as part of the festivities, and I think everyone really enjoyed himself.

All of us were very happy to hear about the United States Supreme Court decision rejecting the advertising laboratories' appeal. We hope this will take care of things now.—*W. B. Brady*

G. V. BLACK

The G. V. Black District Dental Society was guest of Springfield Memorial Hospital On October 11. A cocktail hour and dinner was held in the nurses dining room, then Dr. Gerald J. Casey, secretary of the Committee on Hospital Dental Service and the National Board of Dental Examiners, spoke on the role of the dentist on the hospital staff. This was a very interesting talk which stimulated a gainful discussion. Our thanks to Dr. Robert T. Curren, chairman of the meeting, for arranging such a fine program.

The auxiliary of the Society held a luncheon and social meeting at the Illini Country Club on October 11. There were thirty-two ladies present.

Congratulations and best wishes to Dr. Carter C. Hagberg who has just returned from military service and has opened a new office associated with the Springfield Rural Urban Clinic.

James Donelan, Bert Gilbert, Charles Jordan, Robert Lee, George Thoma, and J. R. Jones attending the meeting of the American Dental Association in Atlantic City, N. J.

Jerry Millhon and Jim Bradley attended the meeting of the American Society of Oral Surgeons in New York City in September.

Mr. Harold Vasconcelles, regional manager for the Social Security System, Springfield, will be the November guest speaker.—*J. Bradley*

McLEAN

The November meeting was well attended with Dr. Ed. Thompson of the Carle Clinic presenting a paper on "Pain and Apprehension." Talk around the dinner table revealed that Vernon Haas is sporting a Page-Chayes High Speed outfit. Hew to the line and let the chips fall where they may.

Darol Johnston of Fairbury is longing to move into his new home. We understand Dale Fitz-Henry has no name for his western-styled office. Perhaps "Tooth Acre" . . . or "Open Wide Ranch" would do. No kidding, Dale, you can be mighty proud of that office.

Irwin Lebow, the local oral surgeon, has been again invited to present a clinic at the Chicago Midwinter Meeting. Incidentally, he now has facilities for general anesthesia at his office. How many patients to the tankful, Irv?

John Holub and George Van Steenberg are back from the Canadian country after a successful trek for fish and fowl. John Wettaw has returned (reluctantly) from a hunting and fishing trip into Wyoming and Colorado.

Try barbecued antelope steaks for a taste-thrill, John.

Even though Fred Lauder is a N. U. graduate, he has been real faithful to the Illini at the "beeg" games on Saturdays. We are all happy to see "Cliff" Sperry back in the swing of things after surgery on a slipped disc. L. G. Freeman, too, is a participating dentist after a respite in the hospital.

Gee, whiz, its almost Christmas again. All of us in McLean Society wish all of you fellers a Merry Christmas and a prosperous new year.—*Wilson M. Baltz*

FOX RIVER VALLEY

A large attendance marked the monthly meeting of the Fox River Valley Dental Society, October 17, at the Baker Hotel, St. Charles. A dinner preceded the program.

During the business meeting the following new officers were installed for the ensuing year: President, Tom Howland of DeKalb; vice-president, Eugene Blair of Elgin; secretary and treasurer, Paul E. Kaiser of Aurora; and board of governor members, Ian West of Elgin and Tom Derrington of DeKalb. A vote of appreciation was given the retiring president, L. C. Rasmussen of Aurora, and his staff for the work done during the past year.

The program was presented by Professor John Osborne, head of the department of dental prosthetics, School of Dental Surgery of Birmingham, England. He gave a most interesting and instructive talk on "Some Prosthetics Problems," which he illustrated with slides. Dr. Osborne is in this country as a visiting professor at Northwestern University Dental School.

Several members attended the American Dental Association meeting in Atlantic City recently. Among them were L. C. Rasmussen, Arthur Roberts, Joseph Wadkins, Walter White, Howard Gillette, Don Lies, Robert Barnes, and Phillip Kartheiser.—*P. J. Kartheiser*

WHITESIDE-LEE

The annual Northwest District Dental Society meeting took place at Jul's Danish Farm in Rock Falls on the 24th of October. There was good attendance at the meeting in spite of the beautiful weather. The State Society officers were well represented at the meeting by President Tom Starshak, President-Elect Cliff Isenberger, Treasurer Bob Pollock, and Paul Clopper our ever present secretary.

During the afternoon session Curt Gronner, who was our delegate to the A.D.A. meeting at Atlantic City, gave a report on the meeting and this was added to by the various state officers who had also attended the meeting. Tom Starshak also spoke about the latest developments in the suits against the laboratories in the Chicago area.

Dr. Frank M. Wentz associate professor of periodontics, Loyola University School of Dentistry, was the clinician for the afternoon. In a very short time and doing a very good job of it, he discussed many clinical features of the oral mucous membrane—covering differential diagnosis, etiology, and therapy of oral lesions and diseases.

After a good prime rib roast beef dinner Dr. R. H. Friedrich, who is secretary of the A.D.A. Council on Dental Health, gave a talk on the many things that the American Dental Association and state societies are doing to help dentists. He mentioned some things that one society is doing for its members that all societies should be doing for their members. In other words, in order to keep up with our changing times there are still a number of projects that a state dental society could

be doing in order to help dentists improve their services.—*Jerry Voss*

PEORIA

The Peoria District Dental Society is most proud of the accomplishments of one of its members. At the National Convention in Atlantic City, Mary Simmons was elected President of the American Women Dentists Association.

Peoria dentists attending the meeting in Atlantic City included delegate Malcolm Elson, alternate Russ Burke, State Secretary Paul Clopper, Clarke Chamberlain, retiring A.D.A. trustee Larry Jacob, Pat Hoag, "Shorty" Bollinger, Larry Strong, Mary Simmons, and Janet Lindenberg, assistant to Larry Strong. Pat Hoag and Clarge Chamberlain attended a meeting of the Periodontology Society of which Clarke is secretary.

Our dental society held its monthly meeting in the Carrousel Room of the Pere Marquette. The subject was "Dental First Aid Clinic." Two films, " Operation Ivy" and "H-Bomb Over Illinois," were shown, and lectures on "Emergency Medical Treatment" were given by Mr. Gene Keltner, director of first aid of the Peoria Red Cross Chapter, and Mr. John Wendland, chairman of this organization. Demonstrations were conducted with audience participation, showing the newer method of artificial respiration, the "back pressure-arm lift method of artificial respiration."

One of the major problems in case of an atomic disaster will be that of caring for the mass of casualties. Our participation is inevitable. In the absence of a physician, the dentist will assume all responsibilities and duties of the physician.

To prepare for these unusual responsibilities, both dentists and physicians must now take training to be able to operate in these emergency situations.

Our local chapter of the Red Cross has been at work since last August preparing our basic training course. Advanced courses will be available at a later date. The dental assistants attended this important meeting as guests of "the boss."

Best wishes are extended to Cliff Becherer, the chairman of our new Civil Defense Committee. Cliff has always been a willing worker for the Society and since he just recently completed a course at Great Lakes in first-aid and civil defense work, he will be well equipped to quide this committee in the work they have before them. If any of you fellows are interested in this type of activity and would like to help, see Cliff. And by the way, Cliff is also a member of the harbor defense unit of the Coast Guard in their civil defense program that was activated recently. Also attending the Armed Forces Medical - Dental Symposium at Great Lakes were Wilson Hartz and H. D. Tow.

We extend our prayers and best wishes for a speedy recovery to Gene Mahle and Gordon Simmons who have suffered mild heart attacks.

Eisenhower and fluoride won unanimously in Peoria on November 6. Since this column must be in the mail, full particulars about our successful campaign for sodium fluoride will appear in next month's column. Many local dentists have put long hours of hard work into this battle, and I want to write the details in full when I have gathered the information.—*Bud Kreft*

LA SALLE

The fall meeting of La Salle County Dental Society was held October 25 in Toluca with President Ned Vespa in charge. The turn out was excellent,

and Ned as usual had a fine program and dinner, both for the Society and the ladies. We had a representative from the Social Security Office who explained social security as it effects dentists. Phil Wendell of Ottawa was elected president for the coming year. The following other officers were elected: Louis Sellett, vice-president; Harry Ciocca, secretary-treasurer; Antone Zukowski, editor; and Don Vespa, librarian.

The next meeting will be in Streator, January 10, with the following in charge: Ed Sheehan, E. C. Waite, Ray Coveny, Robert Dahman, Frank Rowe, and Harry Mason.

Greetings to our new members: Kern, Murdock, Condron, Mason, Hatton, and Darwish.

There isn't very much to report about summer activities. If the members from all sections of the county would drop the editor a note about their vacations, we would have more news of a personal nature and more frequent articles in the JOURNAL.

Our dinner dance September 19 was well attended, and we all had a fine time. The committee of Damer, Wiese, Wrobel, Sellett, Postma, and Estrin did a fine job, and prizes were a novel idea. I wonder what happened to that pinch bottle Frankie Rowe won. Immediately after, he did a disappearing act, bottle and all.

Our condolences to Lecocq on the death of his father.

See you in Streator in January, and how about some news?—*A. L. Zukowski*

WINNEBAGO

The Winnebago County Dental Society welcomed four new men at the October business meeting: Pete Paesani, associated with Dan Hogan; George Metzger, with an office in the Rockford Trust Building; Bob Heath, associated with his Dad, Vern Heath; and Richard Tunberg of the Rockford Plaza. After much discussion the W.C.D.S. voted to accept these men as members as soon as they earn enough money to pay their dues.

Unlike the seekers of public offices, the officers of the W.C.D.S. do not campaign or solicit votes. Instead they are railroaded into office on the basis of their past merits. Such was the case in the selection of this year's officers. We used to call Dr. Shepherd "Torch" for obvious reasons, but now that he has beeen elevated to the highest office in the society, he likes to be called "Pres." Our new V. P., Harold Grundset, will keep him in line, while Dan Hogan, keeper of the archives and monetary surpluses, will see to it that he pays up at every meeting, just like the rest of us.

The regular October meeting was an afternoon and evening session led by Col. Mills, boss of the U. S. Army's Central Dental Laboratory. Col. Mills presented two papers dealing with the diagnosis and treatment planning for full and partial dentures. Especially helpful were his suggestions regarding design of partial dentures.

Before this gets into print, the best meeting of the year will be past—the Annual Ladies Nite of the W.C.D.S. For a full report of that meeting be sure to read Lou Fourie's column in the next issue of the JOURNAL.—*Bob Nyboer*

MADISON

On October 11 the Madison District Dental Society held its annual fall outing at the Edwardsville Gun Club, Edwardsville.

As usual, a very large crowd was in attendance for the all-day social affair which was graced by the presence of

the fair ladies. Card playing, boat trips on the lake, and trap shooting were some of the many forms of entertainment offered.

L. Hood Harris was prize chairman, and he did an excellent job. He was assisted by Mrs. Harris, Walt and Jerry Witthofft.

Clarence and Mrs. Harrison arranged a wonderful smorgesbord for the noon lunch and a barbecue chicken dinner for the evening meal.

Everyone received a prize and all went home happy.

We are sorry to have to say that Neil Vedder is seriously ill at his home in Carrollton. Dr. Vedder has worked hard and long for the advancement of good dentistry. He was twice president of the Madison District Dental Society, is past president of the Illinois State Dental Society, and has also served on many A.D.A. and State Dental Society committees.

I'm sure he would enjoy receiving a card from his many friends. His address is Dr. Neil D. Vedder, Carrollton, Illinois.

Not much news except that many dental offices are closed in our district in favor of duck hunting.

—Philip A. Ritter

Using the Ultrasonic Dental Unit *(Continued from page 776)*

tively at present in routine office practice. We look forward, however, as is the case with each new piece of equipment, to further technical development which will eliminate the bugs inherent in a new device.

We also feel that the ultrasonic dental unit shows great future potentialities which have not been tapped as yet. The more men who work with it, the sooner will it be fully evaluated and these potentialities realized.

It is our hope that this new instrument and the completely new approach to restorative dentistry, which is becoming known as ultrasonic dental preparation, will not be prematurely judged by those who have had insufficient experience with it in actual practice.

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CURRENT NEWS

INFRACTION OF LAWS COMMITTEE REPORTS ON JOLIET CASE

The Boyden case in Joliet is now where we have wanted it for many long years. Boyden started serving a sentence of one year in jail. (June 15, 1956) with a fine of one thousand dollars for violation of the Illinois State Dental Practice Act. After completing this term he has another sentence of three months and a fine of two thousand dollars, given in Circuit Court for violation of injunction.

The credit for this work must be given to the untiring efforts of the Infraction of Laws Committee of the Will Grundy County Dental Society: Drs. Seron, Blim, Wallace, Fornango, Green, Larkin, Limacher, and Hill, chairman. Also the very fine cooperation of States Attorney Frank H. Masters Jr. in prosecuting this case.

Of course every member of the Illinois State Dental Society knows by now of the very favorable results of the Supreme Court decision in the cases of violations by the Chicago and Danville Dental Laboratories.

The contribution of your Illinois State and Chicago Dental Society officers, the Prosthetic Dental Service Committee, and the Illinois Dental Laboratory Association are bearing fruit in this work. Let every member give his best by being alert and reporting any violation.

Your Infraction of Laws Committee for 1957 will do its best.

H. L. Henderson
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Chairman

F.T.C. LIMITED DEBATE DRAWS A.D.A. PROTEST

"The American Dental Association has protested sharply to the Federal Trade Commission a recent ruling by its staff members that any public hearing on a revision of the F.T.C.'s Trade Practice Rules for the Commercial Dental Laboratory Industry be strictly limited to matters of terminology. In early October, the F.T.C. agreed to call a public hearing to consider the A.D.A.'s petition that the Rules, as promulgated, failed to describe accurately the legitimate functions of dental laboratories or the proper relation between the dentist and the commercial laboratory. The A.D.A. petition also asked that such words as "design" and "occlusion" be deleted from the Rules.

In a preliminary conference with F.T.C. staff members, A.D.A. representatives were informed that the public hearing would cover three general points: (1) the request for the deletion of objectionable terms, (2) a clarification of the relationship between the dental laboratory craft and the dental profession, and (3) the inclusion in the Rules of language curtailing the illegal activities of mail order denture firms. At a later meeting with representatives of the A.D.A. and the National Association of Dental Laboratories (N.A.D.L.), staff members of the F.T.C. ruled that only matters relating to certain terminology could be discussed at a public hearing on the Rules; also, that there could not be any discussion of the relationship between the profession and craft and the problems associated with advertising by mail order denture firms.

The F.T.C. officials refused to re-

consider this ruling despite requests from both the A.D.A. and the N.A.D.L. that a full discussion of the issues involved would be necessary to provide full information for a final decision on the amendment of the Rules. A.D.A. representatives pointed out that under such limitations, a public hearing on the Association's request for amendment of the Rules would be meaningless.

Formal Request to F.T.C.

Dr. Walter E. Dundon, chairman of the Council on Dental Trade and Laboratory Relations, formally asked the F.T.C. to overrule its staff decision that the public hearing on the Rules be strictly limited to matters of terminology. In a telegram sent November 13 to the Commission, Dr. Dundon charged that the decision as announced last week would make "a fair and complete hearing an impossibility." Dr. Dundon informed the members of the F.T.C. that unless the ruling is modified, the Association "will be compelled to apply all its resources to seek the complete and immediate revocation of the Rules." The text of the telegram to the F.T.C. from Dr. Dundon follows:

"The American Dental Association protests the arbitrary action of the Trade Practice Conferences Division of the Bureau of Consultation of the Federal Trade Commission denying this Association the right to present to the Commission at the forthcoming public hearing all the information essential to an intelligent revision of the trade practice rules for the commercial dental laboratory industry.

"As directed in your letter of October 3, Association representatives have conferred with representatives of the National Association of Dental Laboratories and the Trade Practice Conferences Division on October 25 and on November 8-9. At the November meeting, Association representatives were advised for the first time that the Association would not be permitted to make available to the Commission vital information describing the relationship between the dental profession and the dental laboratory craft and the necessity for incorporating within the trade practice rules an appropriate limitation on the public advertising campaigns of unethical dental laboratories whose business activities imperil the health of the public.

"The position now taken by the Trade Practice Conference Division is directly contradictory to that indicated in the October meeting and was made over the objections of this Association and those of the National Association of Dental Laboratories. This decision makes a fair and complete hearing an impossibility. Unless this decision is appropriately modified this Association will be compelled to apply all its resources to seek the complete and immediate revocation of the Rules. This Association requests the opportunity to discuss this matter with Commissioner Robert T. Secrest at the earliest possible date."

Atlantic City Resolution

At the Atlantic City annual session in October, members of the A.D.A. unanimously approved a resolution calling for amendment of the Trade Practice Rules. This resolution was approved shortly after an announcement by the F.T.C. that it had denied requests from several dental societies that the Rules be revoked. The F.T.C. also denied a request from the A.D.A. that the Rules be suspended pending a public hearing. Originally, it was expected that the public hearing might be held in December. In view of recent developments, however, officials now decline to hazard a guess as to when the public hearing would be scheduled.

HIGH SPEED AND SUPER SPEED

(Continued from page 769)

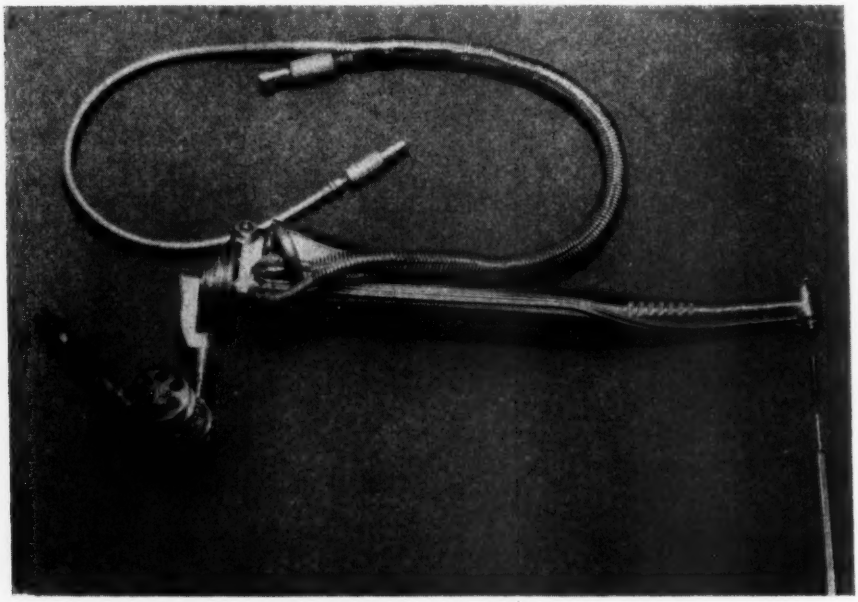
Page-Chayes angle: The super speed of this instrument (Figure 5) is obtained by a mechanical pulley arrangement having a ratio of six to one from the drive pulley to the cutting head pulley. The pulleys are ball bearings driven by a rubber impregnated nylon belt that runs within the angle; air-water attachments are built in; and there is an air seal which is maintained by constant air pressure in the head of the angle, so that no debris can enter by centrifugal action.

Rubber Chuck Holder

This angle uses a new principle to engage the cutting instrument. A rubber chuck is used instead of the conventional bur tube to hold the bur or diamond in the head of the angle. The shanks of these instruments have a diameter of one-sixteenth of an inch which is smaller than a conventional shank. The rubber chuck is easily replaced when it is worn and allows the operator to obtain quickly a true running instrument. No lubrication is necessary, because of the air seal. The ball bearing pulleys are lubed at the factory.

Two Speed Ratio

Midwest transpeed handpiece and hi-drive angle: The super speed of these instruments is obtained by two speed ratio increases. (1) In the handpiece (Figure 2) the increased speed is obtained by an additional pulley between the wrist joint and the spindle pulley, driven by a rubber belt. (2) In the hi-drive angle there is a gear step-up transmission that increases the speed ratio an additional 2½ to 1. To obviate the



(Figure 5) Page-Chayes angle. Note the rubber chuck and replacement tool.

heat rise and need for maintenance, a constant spray of lubricant is projected through the angle by an air line connected to a cartridge of detergent lubricant. Conventional latch type burs and diamonds are used, engaged in a nylon bur tube.

Globe angle: This is a handpiece angle which obtains its super-speed range by utilizing the pulley reduction belt principle. The same belt which travels from motor shaft along the arm, enters the angle to drive a small pulley at the cutting end. The ratio is about twenty-five to one and speeds in the 100,000 rpm range can be obtained. The wrist joint has a system of staggered ball bearing pulleys to allow the belt to enter the angle. The conventional latch type bur is engaged by a collet device which locks it in position.

Cartridge Lubrication

Lubrication is accomplished by the forced injection of oil using a cartridge attached to the air cut-off on the unit. It must be lubed at frequent intervals. Maintenance of the angle can be accomplished in the office by changing the head pulley collet.

Super Speed Application

The application of a super-speed instrument to a tooth is a revelation to both dentist and patient. Along with the increased surface feet cut per minute, the super speeds allow the smaller cutting instrument to accomplish what the large cutting instrument did at high speed.

In the Page-Chayes angle, the lack of metal to metal contact which transmits vibrations is reduced by the cushioning effect of the rubber chuck. The patient perceives a brush-like effect instead of objectionable vibrations.

The carbide bur is a most efficient instrument at speeds beyond 100,000 rpm with a P-C angle. The rake angle of the bur flute allows debris to be carried away faster than with the diamond instrument at these speeds, and the higher impact force is accepted because of the very high frequency of impact. The rubber chuck absorbs and diminishes the amplitude of vibration. An increased volume of water, however, is

The Chicago Academy of Dental Research is a group of practicing dentists engaged in the research and study of dental materials and techniques, thereby fostering and cultivating educational relations of the members, broadening their interests in the pursuit of their profession, and improving their standards of efficiency and productivity.

The information they receive and gather is disseminated to the membership and to the profession as a whole.

The High Speed Committee of the Academy, which prepared this paper, is composed of:

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essential at super speeds to prevent any damaging effect to the dental pulp.

Diamond instruments are slightly less efficient at super speeds than are carbides, but diamonds with *larger particle size* perform very well at super speeds. (Exactly the opposite of high speed.) Moreover, the diamond instrument leaves a smoother surface on the cut tooth structure than the carbide bur.

Six of the members of our group carefully recorded patient subjective reactions to tooth preparation at super speed. The total number of preparations tabulated as of July 1956 was 3,527 preparations of all types. The following is a report of the response of these patients to super speed.

Percentage of Patients	Reactions
2	Refractory
0	Negative
3	Less irritating than usual
65	Felt only brush effect
20	No cutting perceived
10	No bone conducted vibrations perceived

The greatest percentage of patients responded favorably, although some were annoyed by the increased airborne sounds. Clinically, patients like super speed.

Conclusions

The members of our academy have experienced the pleasures derived from the use of high speed. We have used it during all of its developmental stages, to our benefit and our patient's benefit, and the conversion from conventional speeds to high speeds is readily attained by any operator. Now that high speed has reached maturity, its sound principles, along with the benefits derived, warrant its general acceptance by the profession.

The choice between high speed and super speed, as we have defined it, is an individual decision, since both have considerable merit.

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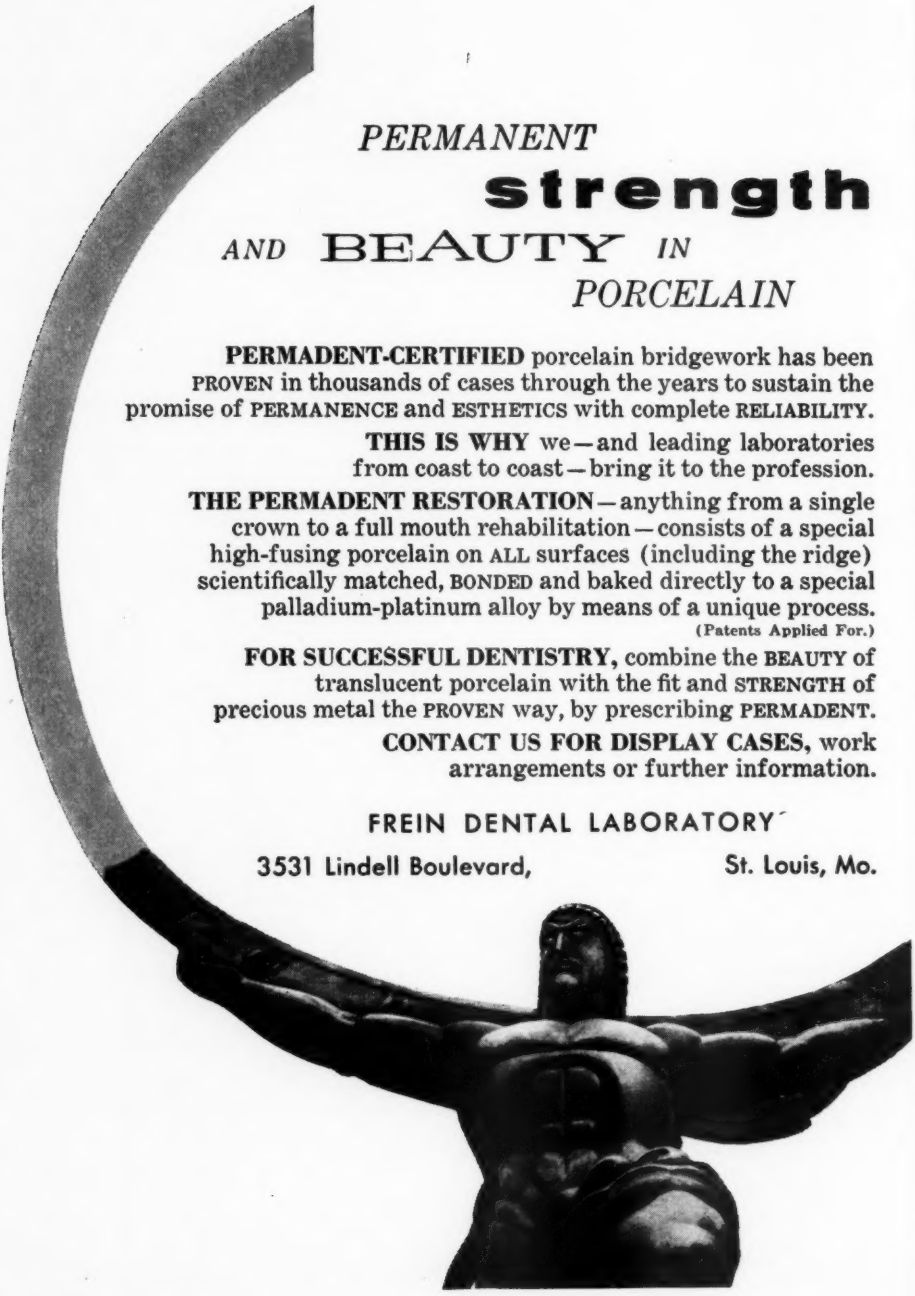

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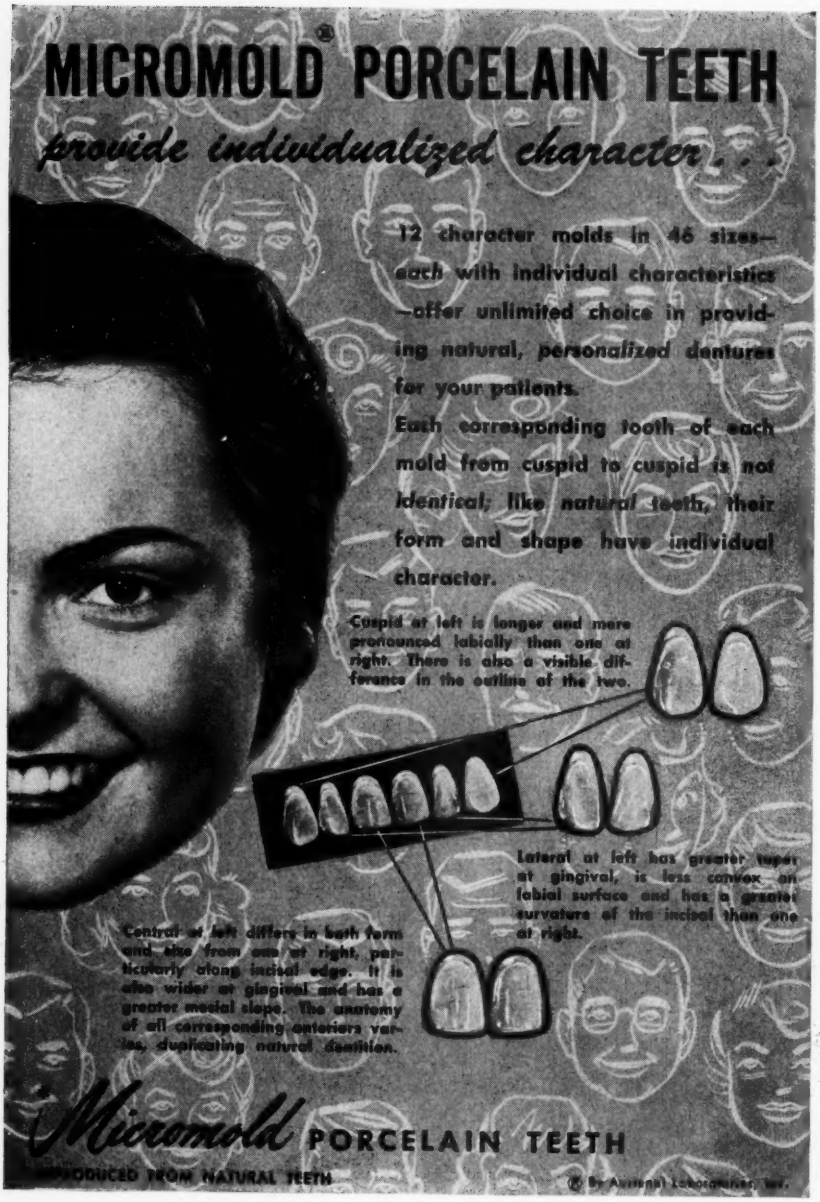
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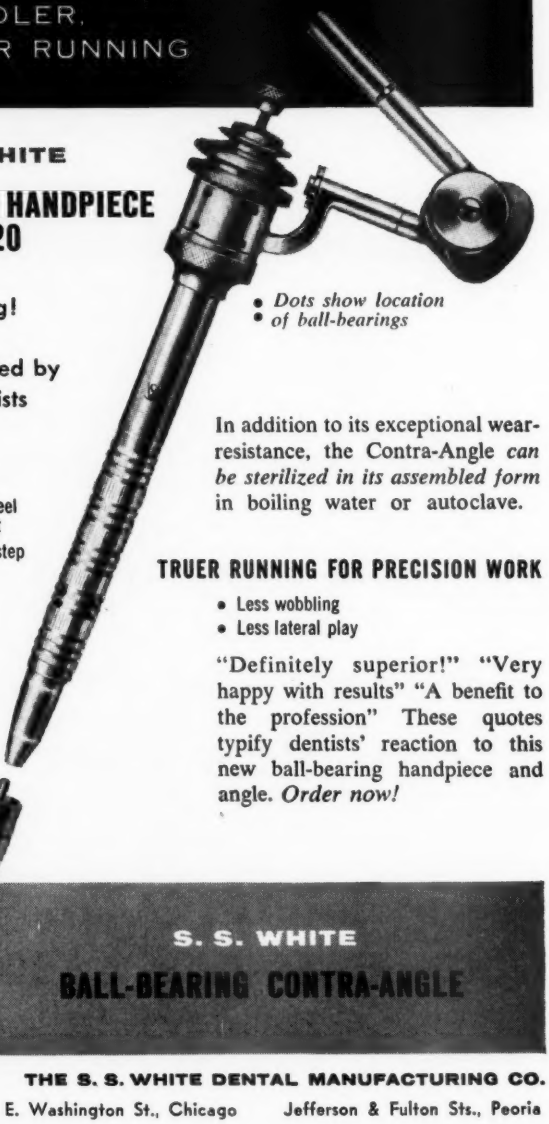

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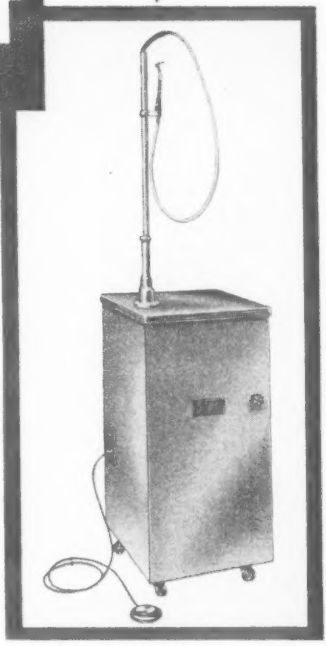

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*JADA Vol. 47, P. 324-329, Sept. 1953. NELSEN, R. J., D. D. S.; PELANDER, C. E.; KUMPALA, J. W.: Hydraulic Turbine Contra Angle Handpiece. (Reprint on request).

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